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ENVIRONMENTAL STUDIES
FOR
SPECIAL EDUCATION TEACHERS

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Prepared by

Ontario

The Ministry of the Environment

Ontario, Canada

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GOVERNMENT DOCUMENTS

The Eliot Pratt Education Centre
New Milford, Connecticut

and

EARTH SYSTEMS *group*
Orefield, Pennsylvania

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PREFACE

Over the past decade, environmental education has gained more and more opularity in the Canadian classroom. This is due to the fact that the ideal nvironmental education program, which encompasses nature appreciation, con- ervation, outdoor education, population and pollution studies, can improve a oungster's achievement in regular school subjects, builds self-confidence, ncourages interpersonal relationships, and builds leisure skills.

And this is true for all children, including those with special needs!

For a child, whether he has a learning disability, a limited learning otential, or a handicap caused by a physical impairment, still has more than nough senses remaining to enjoy being outdoors, and to profit from learning bout his natural environment, its lore, its inter-relationships, and its leasures.

This manual has been prepared to assist special education teachers in the ncorporation and implementation of environmental studies in their regular lassroom activities.

The learning experiences are many and varied to permit the teacher to hoose ones which are applicable to his or her students. Naturally, the child's andicap, age, and maturity must be taken into account.

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ABLE OF CONTENTS

- reface i
- bout the Authors ii
- cknowledgements iii
- able of Contents iv
- earning Experiences 1
  - Interpretative Walk - Spring 3
  - Values Clarification 7
  - Natural Community Profile 31
  - Community Profile 37
  - Biological Aquatic Studies 45
  - Simplified Weather Study 47
  - Language Arts in the Environment 51
  - Building Simple Weather Equipment 55
  - Related Activities Weather 59
  - Acclimatization 61
  - Insects and Plants 63
  - Listening To and Looking At Insects 65
  - Birds: Observing Habits and Anatomy 67
  - Form Follows Function 71
  - Reptiles and Amphibians 75
  - The Energy Chain 81
  - Comparison of Soil Types 85
  - Communications: Sketching and Writing 89
  - Experience in Expressing Textures 93
  - Experience in Sketching 97
  - Communications: Nature Books 99
  - Spring Wildflowers: Flower Function 103
  - Plant Identification 109
  - Animals of the Woods and Field 113
  - Nature Hunt 117
  - Orienteering: Simplified Mapping Skills 119
  - Physical Structure of a Stream 125
- te Development 135
- lossary of Terms 149
- ferences 157
- lms 165

Learning Experiences

LEARNING EXPERIENCE TITLE: *INTERPRETATIVE WALK - SPRING*

AUDIENCE AND/OR GRADE LEVELS: All Audiences

CONCEPT: Theme of Learning Experience: *Community structure changes throughout the year.*

OBJECTIVES: After this activity participants should be able to:

(1) Name several sounds heard on the Interpretive Walk.

(2) Name several animals and birds seen.

(3) To identify animal droppings as a sign of animal presence.

(4) Define hibernation and migration; and tell what is happening in these processes now.

(5) Show evidence of vocabulary by answering questions and using words in their vocabulary and in writing.

(6) Pick out three leaves with differing shades of green and three leaves with differing textures.

(7) Describe leaves in terms of color, texture, and possible odour.

(8) List plant and animal signs found on the walk.

(9) Demonstrate an increased awareness of different shades of a color by comparing shades of same color in their clothes and in their environment.

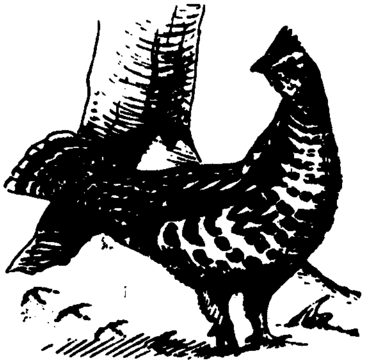
CONCEPTS:

(1) Spring is a time of increased plant and animal activity.

(2) Increased activity is triggered by warm weather.

(3) Hibernating animals emerge in Spring.

(4) Migrating birds are returning.



THE TRIP:

PLANTS:

When you think of this season, of what color do you think? Are all greens the same? Try to describe any differences you see. Are different plants different shades of green? Can you find more than one shade of green on one plant? Do some plants have different shades of green on the upper and undersides of their leaves? Are the leaves and buds the only parts of the plants that are green?

Are all buds green? When you look up toward the sky, do all the trees look green at the top? Describe some of the differences. Do you see any buds that are brown? Do you see any buds that are red? Orange? Can you find, closer to eye level, any opening buds with a brownish or reddish color? What part of the bud is that color?

Do all plants get green at the same time? Look at the tops of the trees, the shrub layer, the forest floor. Have any plants already bloomed? What makes you think so? Are some plants in bloom now? Can you find flower buds on some plants? Do some plants just seem to be coming up now? Do you think all of these plants started getting green at the same time? Why or why not?

Look at the leaves on the forest floor. Are they green? Were they once green? What makes you think so? When? How do they feel? Feel some green leaves and describe how the green ones feel compared to the brown ones.

Feel green! Rub your fingers along and across some of the leaves again. Do you hear anything? Try to describe the sound. How is what you hear explained by what you feel and see? How does a handful of green leaves sound compared to a handful of brown leaves?

Smell green! How would you describe the smell of the leaves on the forest floor? Do the new leaves smell like this? Can you find leaves with different smells?

ANIMALS:

Do you think we can find any birds or animals today? Will we see as many as in winter? Summer? Can you find signs of animal life? Where might we find signs of animals? Do you think we would see any baby animals? When do animals give birth to their young? How do animals behave when they are afraid? Would you expect to see animals when you are in a small group? Alone? In a large group?

Could you get stung by a bee today? Would you expect to see a fly? Where do you think we would find insects? Do you know anything that eats insects?

BIRDS:

Some birds leave their homes in the fall. Where do they go? When do these birds come back? How can you tell if there are birds around? What kind of activity are birds busy at now? Where would we find bird homes? What do birds eat? Where should we look for birds? Do all birds have the same song? Why do birds sing (to defend territory, attract a mate, warn other birds of danger)? What might we see that could tell us the type of bird that has been here before us?

ARNING EXPERIENCE TITLE: *VALUES CLARIFICATION*

DIENCE AND/OR GRADE LEVELS: All Audiences (dependent upon instructor)

RRICULUM AREAS: Social Science, Science, Human Relations

NCEPT: Theme of Learning Experience:
Values and their clarification are necessary to help students develop skills and knowledge in understanding their relationship as individuals to the Planet Earth.

JECTIVES:

(1) To offer participants a basic understanding to the term "values", "clarification", and related terminology.

(2) To have participants become actively involved in one or more "values clarification strategies".

(3) To expose participants to various techniques utilized with special education students to develop values clarification.

PLANATION OF ACTIVITY:

The lessons presented in this session will provide a wide variety of arning possibilities requiring students to exercise both manual and intel- ctual skills. For the special education audience, activities concentrate rgely on developing an awareness and appreciation of the natural environ- nt -- although there are also opportunities to apply technical concepts and spond to real issues of resource management.

According to a new value clarification theory (Values and Teaching by ths, Harmin, Simon; Charles E. Merril, 1966), teaching the valuing process ntails three important steps:

1. The teacher should provide time and opportunities for a child to express his ideas, feelings, and experiences concerning environmental topics.

2. These value expressions should be accepted non-judgementally. If they are not, the student will soon learn to keep his true values to himself in order to avoid criticism.

3. The student should be encouraged to examine in more detail his position on specific environmental issues, as well as explore other aspects of the problem.

There are many value clarification techniques available to the teacher. e following seven processes are based upon the belief that valuing involves:

1. Choosing freely, without the restrictions of authoritarian rules. What kinds of personal behavior changes can you make to help improve environmental quality?

2. Considering alternatives before a choice is made. How many alternatives did you consider before determining how you would help improve the environment?

3. Carefully examine the consequences of each alternative. Did you consider the consequences found in the various ways of combating environmental pollution?

4. Being proud of your choice. Are you proud of the methods you selected to ease the pollution problem?

5. Sharing your convictions with others. Have you publicly affirmed your belief in what you chose to do to protect the environment?

6. Acting according to your choice and not just having good intentions. What have you actually done within the past week to reduce pollution?

7. Acting repeatedly and incorporating the behavior into your life pattern. Did you incorporate these anti-pollution behaviors into your life on a regular basis?

Teachers can weave these seven valuing processes into many student learning activities. The following teaching strategies are designed to help students clarify their values about their environment.

PROCEDURE:

Offer the participants an explanation and/or involvement with all of the activities given in the following pages.

- *Discussion of values*
- *Discussion of value strategies*
- *Simple value activities*

- Obtain family scrapbooks in your community -- show changes through time.

- Project your needs in the year 1980, 2000, 2020.

- Find something worthless. Bring it to class and see if you can prove it.

- Prepare a list of reasons why you are in school, why you don't want to be in school -- discuss.

- Spend a day without saying 'no' to anyone.

- Double Standards -- Do something that you are allowed to do from which other people, for some reason, are excluded.
  Inward -- Defend your privilege.
  Outward -- Why not?

- Spend time with member of school staff (anybody). Why did you pick who you did?
  Try to change someone's attitude about something. Did you? How?
  Defend to your class something in which you believe strongly. Defend something in which you do not believe.
  Plan how to 'have a happy day'. Can you plan happiness?

- Recreate a good feeling.
  Inward -- What is a good feeling?
  Outward -- Discuss what others feel are good feelings.

- Explain who you are today and who you were yesterday.
  Inward -- Have you changed?
  Outward -- Why or why not?

- Watch people in a group or crowd.
  Outward -- Note how many are happy. Why or why not?

MAKE A SCHOOL SURVEY

Number of:
  smiles
  frowns
  angry people
  sad people
  happy people
  frightened people

WHAT DID YOU LIKE, DISLIKE?

School Size:
  number of students
Type of school system:
  graded
  non-graded
  modular
  no scheduling
  scheduled

Ask, "Are you satisfied with your life?" Jot down answers.

Stuff:
  Clip board)
  Paper) Graph Results
  Pencil)

Words for the day:

HUMAN ECOLOGY

- Using any media, express "loneliness"
  Inward -- Why?
  Outward -- How?

- Reflections --
  Draw a picture of your visible self and invisible self.
  Stand in front of a mirror. Ask a friend what he sees in you.

- Photograph or identify the most powerful person in your school.
  Inward -- Why not you?
  Outward -- Why he?

HEAVEN IS IN YOUR MIND

Design a Utopia. Consider type of environment, government, and interrelationships of man.

- More: Design an ideal classroom. Publish it.

KEEP IT ALIVE

Keep something alive for as long as you can.

Inward -- Explore *Why did you use that?*

Outward -- Explore *How did you do it?*

Life: Animal or Plant

IF ELECTED...

You are a candidate for the position of Prime Minister of Canada.

Write your platform.

REST IN PEACE

Write an obituary (death notice) for something in nature.

Some suggestions:

- WINTER
- SUMMER
- A STREAM
- AIR
- AN ANTELOPE
- A LEAF
- A FOREST
- AN INSECT
- AN EAGLE
- A BIRD
- A TREE

Here is a sample format, although you are free to write an obituary in your own form. You can use as many of these suggestions as you wish, or add your own.

__________________, age_____ died yesterday from_____________________.

He was a member of ______________________________.

He is survived by ______________________________.

At the time of his death he was working on becoming ______________________.

He will be remembered for _____________________________________.

He will be remembered.

FIELD ACTIVITY: None

MATERIALS:

- Hand-outs
- Activity cards
- Pencil
- Paper

VALUE CLARIFYING STRATEGY

Title: Baker's Dozen

Prepare a list of 13 things (baker's dozen) that you personally use around your house which makes use of electricity. This includes anything at all with plugs which you, yourself, use fairly frequently.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

A. Cross out those you could do without.

B. Circle those which are indispensable, those that mean the most to you.

C. Check those that would not have been on your list five years ago.

Adapted from: Values Clarification
Simm, Kirschenbaum & Howe 5/77

Monitor's Name (print) ______________________________

School Attended ______________________________

Home Address ______________________________
(Street) (City) (Province) (Postal Code)

MONITORING RECORD

ame of program or dvertisement and n which network	Time & Date	Information given (pro-environment) "for"	Information given (anti-environment) "against"
Examples	Examples	Examples	Examples
NBC Mystery Movie "McCloud"	12/15/77 10:00 p.m.	Showed pollution of New York's East River	1. Man drinking from non-returnable bottle. 2. Large car used to show status.
ETV - Ch. 54 "Sesame Street"	1/18/78 4:00 p.m.	1. Ernie and Burt discussing value of trees, oxygen, shade, erosion control, etc. 2. Oscar discussing value of clean air.	
lanned Parent-ood advertisement	5/27/78 9:30 p.m.	Stressed family Planning	

RANK ORDER

1. If I gave you $500, what would you do with it?

____________save it
____________give it to charity
____________buy something for myself

2. Which would you least like to be?

____________very poor
____________very sickly
____________disfigured

3. Which of the following measures should be taken to alleviate the population problem?

____________legalize abortion
____________limit each family to two children and sterilize the parents afterwards
____________distribute birth control information everywhere
____________trust people's common sense to limit the size of their families

4. Which would be your job preference?

____________hard and dirty work at $80 per week
____________clean and easy work at $40 per week
____________dirty but easy work at $60 per week

5. Which would you least like to do?

____________be a hangman
____________be a member of a firing squad
____________be an executioner in a penitentiary

ENVIRONMENTAL VALUES AUCTION*

We, as a group of persons who are interacting with each other, are going to ave an auction. The instructor will serve as the auctioneer of Twenty Items isted on the next page.

The only rules that we are to go by are:

A. Instructor's comments.

B. Pretending that you presently have none of the items listed.

C. Abiding by the following bidding regulations:

(1) You have a total of $5,000 to spend.

(2) You cannot spend more that $2,500 on any one item.

(3) Your bids must open at no less than $50, and no more than $500, and must proceed by increments of no less than $50 and no more than $100.

OTE: The purpose of this auction is to help you clarify value priorities and valuing processes, as well as to stimulate dialogue between participants. It is not a measuring device of individual personality, interest or whatever, but solely for instructional cause.

se the below area and reverse of this page for mathematical figuring.

Adapted from pp. 21-22 of the Human Potential Seminars Participant's Workbook, by James D. McHolland and Roy W. Trveblood, Kendall College Press.

BIDDING SHEET

	Initial $5,000 Budget	Highest Amount I Bid	Top Bid	Why so much/ Why so little
A long life free of illness				
Travel and tickets to any cultural or athletic events as often as you wish				
The love and admiration and respect of friends				
Television and Radio				
An unspoiled natural setting for your home				
Complete self-confidence with a positive outlook on life				
A complete library for your personal use				
A happy family relationship				
An automobile				
A large fruit and vegetable garden				
A very satisfying love relationship				
The ability to speak many languages				
A chance to eliminate sickness and poverty				
Electricity				
A chance to preserve endangered species				
An understanding of the meaning of life				

	Initial $5,000 Budget	Highest Amount I Bid	Top Bid	Why so much/ Why so little
Unlimited funds for the enjoyment of music				
A world without prejudice				
Commercially canned and frozen foods				
A world without air and water pollution				

so much/
so little

TEACHING SCIENCE WITH A FOCUS ON VALUES

(Merrill Harmin, Howard Kirschenbaum, Sidney B. Simon)

Amid the screaming headlines and the general patriotic fervor surrounding he moon shot this past summer, there were many sober-faced people asking some alues questions about the entire event. Almost no one denied the smashing uccess of the scientific and technological achievements which put our men on he moon, but there were many citizens who expressed cynicism about what the oon shot seems to say about our society's values.

Particularly bitter were some black city dwellers who raised important alues questions against a backdrop of decaying slums, rat-infested flats, alnutrition, disease, polluted air, and cities which increasingly become unfit or human habitation.

They were raising questions about national priorities, about where science nd technology should be putting their energies. Once we get into "shoulds" and o the rank ordering of where time, money, and talent are to go, we are walking n the realm of values.

What are science teachers doing about values? To us, it seems that too uch of science teaching has assidously stayed away from dealing with values. der the guise of objectivity, too many of us have simply avoided dealing with he hot and always controversial issues surrounding the science we teach. Maybe feel that issues like biochemical warfare, the Anti-Ballistic Missile system, he "unsafety" of cars and highways, non-degradable detergents, or the fact that hetto children get fewer vaccinations than do their suburban age-mates will omehow be taken up in social studies classes or in some bull session later in a ollege dormitory. To take a kinder view: Perhaps we stay clear of raising alues issues because we do not wish to be guilty of hustling our own point of iew and thus rubbing our students' noses in our own values.

Whatever the case, the writers want to argue strongly and forcefully that alues issues must become a part of the teaching of science -- so much a part of t that almost no topic in any science class will be taught without some opportunity to consider the values implication of that content. "Just the facts, 'am", must be banished from anything to which we give the name, science eaching. The factual approach may have sufficed in an earlier, less complex nd confusing world, but today, with nuclear holocaust just outside the window nd the polluted atmosphere already seeping in, we simply cannot afford to train generation of students who know the *how* and *why* of scientific phenomena, but o not have a process for inquiring into the values issues raised by the topics hey study. In today's world, a two-and-a-half-year-old seems to be able to peak easily about the "we-entwy cwisis" of our astronauts, but we also want an dolescent to understand his own re-entry crisis when he returns home after pending all summer at camp. Or consider the re-entry crisis of the white ommuters, making the round trip through the ghetto on their way to and from ork. Or the black domestic workers, taking the trip the other way.

All right, then, how can it be done? How can we deal with values in our science teaching while avoiding the problems of indoctrinating students with our own values, or equally bad, unquestioningly inculcating society's values, many of which we believe are fraudulent. Can you deal with values without teaching one set?[1]

It has been helpful to see that almost any subject matter taught in science (or in any other discipline, for that matter) can be looked at on three different levels. The first level is the facts level; the second, the concepts level; and the third, the values level.

Take this simple example of a piece of subject matter taught at least once in almost every science curriculum:

Newton's Laws of Motion

Level I (Facts)

1. What are Newton's laws? Learn the formulas derived from the laws.
2. When were the laws formulated? What laws did they make obsolete?
3. Which is called the first law, etc.?
4. Etc., etc.

Level II (Concepts)

1. Demonstrate via certain laboratory experiments, that you know these laws.
2. How are these principles used in recent inventions?
3. Attempt to invent something useful by applying one or more of Newton's laws.
4. Describe the applications of these laws in certain simple machines and devices used in the moon shot last summer.
5. Etc., etc.

Note: It is important to realize that just because questions at Levels I and II recognize an application in today's world, they do not automatically become Level III material. There needs to be a real connection with the students' lives, attitudes, and feelings for the questions to be raised to the third level, the values level.

---

[1] *For a more complete treatment of the "value theory" on which this article is based and for other methods for value clarification in the classroom, see Raths, Louis E; Harmin, Merril; and Simon, Sidney B.* Values and Teaching. *Charles E. Merril Books, Columbus, Ohio. 1966.*

Level III (Values)

1. How, if at all, have these laws touched your own life?

2. Seat belts in cars stem from one of these laws. Do you have them in the car you drive in most often? Do you use them? Explain.

3. What's the fastest you have ever driven in a car? Were you driving? If you weren't driving, at what speedometer reading would you have *insisted* that the driver slow down?

4. Driving a car into a wall is like swinging a one-ton sledge hammer at that wall. Would you rather be the wall or the sledge hammer?

5. Where do you stand on the idea that scientists have an obligation to see that their discoveries, like the automobile, are not used to hurt man?

6. What do you believe automobile manufacturers should be doing to save lives? Would you be willing to start a petition drive on that subject?

7. Etc., etc.

Here is another topic frequently covered in science classes across America. We shall examine it with the same three-levels view.

The Earth's Crust

Level I (Facts)

1. What are the three major groups of rocks?

2. Name three ways water can change the earth's surface.

3. What precious gems are found among the minerals in the earth?

4. How are volcanoes formed.

5. Etc., etc.

Level II (Concepts)

1. Show how two recent dramatic changes of the earth's surface were similar to changes which took place a million or more years ago.

2. Compare and contrast two theories of how mountains were formed. Which do you accept? Give your reasons.

3. Discuss the similarities and differences between precious and semiprecious stones, from a scientific point of view (as opposed to a young bride's point of view).

4. Where on the earth's surface are volcanoes most likely to occur today? Why?

5. Etc., etc.

Level III (Values)

1. Are you someone who is likely to become a rock hound some day?

2. Are the mountains a place where you really like to spend your vacations?

3. Where do you stand on oil companies' getting a depletion allowance?

4. In some states, strip miners find it cheaper to pay the fine than to do the reforestation the law requires. What is your reaction to this? What other information do you feel you need to know about this?

5. Which, if any, of these worry you at all or more than the others?
   a. Converting the Florida Everglades into housing for senior citizens.
   b. Bulldozing a mountain so a four-lane road can go by.
   c. The cities spreading out over the earth's surface, leaving less and less open space.

6. When you get married, do you think you will give an expensive ring to your wife, or if you are a girl, do you think you will want one? Can you think of any alternative ways a husband might show affection for his bride?

7. Etc., etc.

8. Grass is too hard to maintain in a city; cities should be all asphalt. Do you agree or disagree? Give your reasons.

9. How do you think you would have answered these questions last year? Describe how your answers have changed, if they have.

It should be obvious from the above that we are not against subject matter. All three levels are important; yet we like to think of a teacher's job as that of *elevating* subject matter to the third level, that is making the information taught relevant to the students' lives. The values level usually requires the use of information available from Levels I and II, but it often demands additional information, and often insight as well. The additional information can rarely be found in textbooks. It is more likely to come from keeping up with the daily newspaper, the weekly magazines, and the special-interest publications, such as conservation magazines in the example above or magazines having to do with automobiles for the Newton's laws example. The science classroom which has a rack of current magazines would be just that much more likely to get students to examine topics at the third level. Insights, too, come from many sources, such as a personal experience, observations of human behavior, and art and literature.

An important element of the Level III values approach is that it makes consistent use of what we call "you" questions. These are questions which attempt to involve the student in an issue by hitting him where he lives. They strive to make topics relevant in the best sense of the word because the student is asked to take a stand and to sometimes *do* something about the problem raised. It isn't just learning for the 100 true or false questions at the next midterm. It is teaching which aims at a student's values, at his life.

. Here are some other examples of the direction the Level III values inquiry ght take on three topics taught in typical science classes. Again notice that se issues all contain the "you" component and almost always demand current formation over and above the facts and concepts of the science topics themlves. Often the information they require comes right out of the student's fe.

ectricity

Have you ever really received an electrical shock? Why did it happen? Was something broken? What did you do to see that it didn't happen again?

Could you fix an electric motor that wouldn't run? Would this be something you'd like to learn how to fix? What if it were the starter on your own car?

Most power tools need to be grounded. What is done about grounding power tools around your house? Could you convince the power-tool users to change their habits if these were dangerous? How would you go about it?

Calculate how much it costs when the light in your room is on for one hour. For 365 hours. Do you ever leave the light on after you've left your room? Is it a habit you want to change?

Etc., etc.

ather

How often, per year, do you phone the weatherman? Do you trust the weather reports as given on TV? Do you base any of your decisions on them?

Where do you stand on man's efforts to manipulate weather through cloud seeding? What about the issue of taking someone else's rain away from him? Or the conflicts between people who need the rain and others who may be hurt by it?

Weather-related accidents kill many private plane pilots. Would you be the kind of pilot who assumes the weather will get "better up ahead"?

If the points on your car got wet because of rain, would you know what to do about the situation?

Which is your favorite season of the year? Do you have any plans for that season when it comes up next?

Rank order these three things to do on a spring day. Which is your first choice...second choice...third choice?
-- Walk in the woods in a light rain
-- Roam a deserted beach in the sun
-- Buy an Easter outfit in a busy shopping center

7. Etc., etc.

The Frog

1. In dissecting a frog, we remove the pancreas and the mesentary. What would happen to you if we removed yours? Would you give your eyes to science when you die?
2. Would you dissect a cat?
3. Would you eat a frog? Have you ever done it?
4. If you were lost in the woods and were starving, where would you draw the line about what you would or would not eat? Would you eat worms, mice, doubtful mushrooms, etc?
5. Should scientists use live things, and kill them if necessary, for their experiments?
6. Why not use live people in the same way?
7. Etc., etc.

All of these questions about electricity, weather, and frogs are merely suggestive of what might be asked. Different teachers are excited about different kinds of values issues. Raise whatever values questions you care to raise, but note these cautions. Do not insist that there be one right answer which all students must arrive at following the discussion. This would be antithetical to encouraging students to search for their own values, the only values that will ever mean anything to them. After students get the hang of confronting values issues, dealing with "you" questions, and pushing their subject matter beyond Levels I and II, they will start raising values issues. One more caution: We believe it is essential for the teacher to declare where he stands on most of these values issues. However, he must do it with a quiet dignity which does not demand that every student line right up where the teacher is. It means he must suspend his punishment-and-reward system during values discussions or too many students will feed the teacher the values statements he wants to hear. Sometimes the teacher postpones telling the class his position for a week or so. He wants the students to think for themselves; but ultimately, the teacher must have values of his own and state them -- again, with quiet dignity.

Here are some other issues which grow out of science topics. These are Level III issues, but it is important to stress that the student needs to know some science in order to deal with them. It may not always be the science taught in schools; but when that science is relevant, it will concern itself with values.

Level III Value Issues

1. *Consumer Reports* have called new cars as they are delivered to new owners: "do it yourself" kits. What has been your family's experience with a new car? What did the engineers fail to engineer? What did you and your family do about the faults you found? What else could have been done?

2. How much chlorine or other chemicals are needed to keep a private swimming pool clean? Where would you draw the line on how often your neighbors could use your pool if you had one?

3. How did the races of man originate? Would you join a segregated swim club? Would you go as a guest to one? If you wanted to break the segregation at a swim club, how would you go about it?

4. Would you rather have wormy apples instead of using sprays which might be poisonous. What other alternatives are open to you?

5. Would cross-breeding and producing a new vegetable or fruit excite you? Which two fruits or which two vegetables would you like to see made into a new type?

6. What do the critics of the research linking cancer and smoking say? How would you answer them? When you're 21, do you think you'll be a cigarette smoker?

7. How do human beings reproduce? Do you believe that every student in the 12th grade should be given full birth control information before graduating from high school? Who should give this information?

8. Describe the fuel system on the ABM. Are you someone who would write a letter to the editor of your local newspaper on the Anti-Ballistic Missile system? Would you wear a bumper sticker on your car arguing for your point of view?

9. Is toothpaste any more effective than soap and water in fighting tooth decay? Nationally advertised toothpastes cost more than do private brands available at some drug stores and department stores. Which brand of toothpaste do you use? Would you use a cheaper, unadvertised brand? Should cities fluoridate their water supplies? Should they provide free dental care for families who can't afford to pay for care?

0. Are you someone who would never get a motorcycle without a helmet. What else are you doing to stay alive longer?

1. If your community had a piece of swamp land that could be left as is, or drained and used for recreation, a jet port, or a place to dispose of junked cars, which would you prefer. On what would you make your decision? Do you think that this is the same choice that you would have made last year? If not, why have you changed your choice?

Sometimes a teacher begins with content and builds toward values issues. metimes he motivates subject-matter study by opening with a value-oriented quiry. There is no one rule. A teacher knows his style and he knows his udents. What is really important is that students do not become science-phisticates without a deep awareness of the values issues underlying their undant knowledge.

Imagine the impact upon a science class if a teacher brought in a study of the extensiveness of lead poisoning in slum children. Dr. Glenn Paulson of Rockefeller University has reported that there[2] are probably 25,000 to 35,000 lead-poisoned children in New York City alone.[2] They get the lead poisoning by chewing old paint and plaster in run-down housing. Lead poisoning is difficult to deal with because it has symptoms which are easily mistaken for other common childhood diseases, such as the flu. The shocking thing is that lead poisoning can do permanent neurological damage: it can produce severe mental retardation. It can cause this kind of damage to from one-fourth to one-half of the children who come down with lead poisoning. It is also shocking that we still find lead poisoning so many years after the development of lead-free interior paints.

The students could look into the science of lead poisoning. They could get samples of old paint and plaster from slum housing and analyze them. They could investigate the incidence of lead poisoning in other environments. They could try to invent paints which use no lead. It could be all very objective, but, eventually, if one accepts the values approach, there has to be a third-level step which would involve *doing* something about the subject being studied. In the lead-poisoning example, for instance, the students (whether from the slums or the suburbs) could act in the following ways:

1. They could survey what, if anything, their own local health and housing authorities are already doing to solve the problem.

2. They could write a letter and ask New York City to explain what is doing about Dr. Paulson's findings.

3. They could get in touch with Dr. Paulson and offer to do some legwork on the incidence of lead poisoning in their own city or town.

4. They could write their congressmen and urge them to look into the problem and perhaps draft legislation to combat the wasteful and almost criminal neglect of human life which occurs with lead poisoning.

5. They could march with signs in the slum neighborhoods and conduct a campagin to alert the mothers in the slums.

6. They could mimeograph leaflets printed in simple English and Spanish to be delivered door-to-door to slum dwellers.

7. They could push to get a local radio station to give them time to put on a program on the problem of lead poisoning.

Some ways of acting on lead poisoning are better for some students than for others. There should be enough ways for students to act on their values, because the problem isn't an easy one. As Dr. Paulson puts it, it is a problem of getting "the lead out of slum children's guts and politicians' pants". Students could help, if the third level kind of teaching were to become the norm in science classes across America.

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[2] *The Newsletter, Society for Social Responsibility in Science, June 1969. p.2.*

There are an infinite number of topics in science that lend themselves to tion projects. Here are just a few, with some suggestions for possible ojects. Some, such as 5 and 6 in this list, for example, should be undertaken ly with *competent supervision.*

Conservation. Start a letter-writing campaign to make a forest area part of the National Wilderness System. Build bird feeders to encourage wildlife.

Soil erosion. Build check dams in the community. Petition the Public Works Commissioner to combat erosion the class has discovered in the community.

Air and Water pollution. Check your statistics. Begin an anti-pollution campaign. Hold a public meeting.

Smoking. Make the facts available to the school and community. Start a "Smokers Anonymous" after-school club.

Seat Belts. Publicize the facts. Learn how to install seat belts. Start a campaign. Set aside a day when the class will install seat belts, free of charge, for all drivers who will bring their cars and be willing to pay only the cost of the seat belts.

Electricity. Learn about overloaded circuits. Volunteer to inspect anyone's home, free of charge, for overloading.

Sanitation. Study public health hazards of improper garbage disposal. Cooperate with the sanitation department to prepare suggestions for householders and publicity in newspapers.

Anti-litter campaign. Co-operate with a fire department in putting on a demonstration project.

And still other topics that could easily lend themselves to study and some tion projects are: atomic radiation and fallout, the anti-ballistic missile stem, drugs, population control, transportation, gardening, calories and ight watching, exercise and health, proper diet, chemical and biological warre, race and racial myths.

Youth has demonstrated that it wants to play a part in improving our ciety. What better place to start than in the science classroom?

We have argued for an approach to science teaching that would focus upon lues. We have witnessed scientists with too little sense of responsibility r their art and craft for too long. It seems incomprehensible to us that ience teaching should remain so stubbornly value free. Just the opposite is eded if science is to help us survive! We need science with responsibility. need science with a willingness to grapple with the complexities of social sues. Science cannot afford the luxury of business as usual in this day and e. The great advantage that science has as a foundation for values is that ience itself is so "culture free". The laws of science hold true anywhere and erywhere and for any people in the world.

It is indeed a question of values. Lifting subject matter beyond facts and concepts and up to the values level can help, for where science touches upon people's lives, values pertain. Where there is a lack of values, our community life festers and sours. Where there is confusion of values, we work at cross purposes, and our problems become exacerbated. History must not record that science teachers ignored the values issues and stuck to their facts and concepts. To do so would be to remain crudely prescientific and perhaps prevent us from having a future at all.

Reprinted from the Science Teacher, January 1970.

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ARNING EXPERIENCE TITLE: *NATURAL COMMUNITY PROFILE*

ADE LEVEL: Intermediate/Junior High
Severe limitations for vision impaired

NCEPTUAL THEME: *The environment of a natural community has many diversified features.*

JECTIVES: Upon completing this activity, students should be able to:

(1) Differentiate between the types of plants and animals in the area surveyed.

(2) Differentiate between the variety of needs which the plants and animals have in the surveyed area.

(3) Discover the importance of components which aid in the development of a good natural community, such as light, clean air, animal trails, etc.

(4) Identify the role of at least three plants and/or animals in the natural community.

NCEPTS:

(1) Within a natural community, we can identify groups of plants and animals on the basis of sight, color, odour, taste, touch, and habits.

(2) Within a natural community, we can identify the economic needs of plants and animals, such as food, shelter, water, air, space, and other needs that are basic to specie survival.

(3) Natural communities have certain basic natural systems which help the community to function, such as animal trail systems, streams, light and dark areas, micro-climates, etc.

(4) Each plant and animal has their own niche in the natural community environment.

TURAL COMMUNITY PROFILE:

This activity provides for an active natural community investigation by the udents. The study can focus on the types of problems that affect the natural mmunity.

The "field community questionnaire" at the end of the activity is written r student investigation out in the field. The questionnaire, and work sheets, n be duplicated and given to them in a small booklet form. Notations throught the activity will help you in guiding the study.

Since it is impractical in many cases to survey large areas of the forest, the activity is designed so that students can select their own sample areas. This method can be compared to a "Harris" or "Gallop" Poll of a natural area, which does not survey the entire area, but gives a reliable sample of communities within the area. When the survey is completed, they shall have information about various interactions within the natural community.

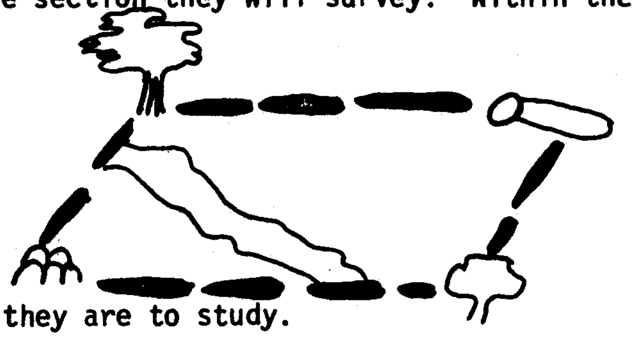
Results from the study could be placed on boards in the form of histograms, maps, or pictures. If the cultural community profile activity is used, differences and similarities can be drawn from both types of communities.

I Profile of a Natural Area

Find a general area where your students will work on the survey. Establish a landmark to identify your general area of survey.

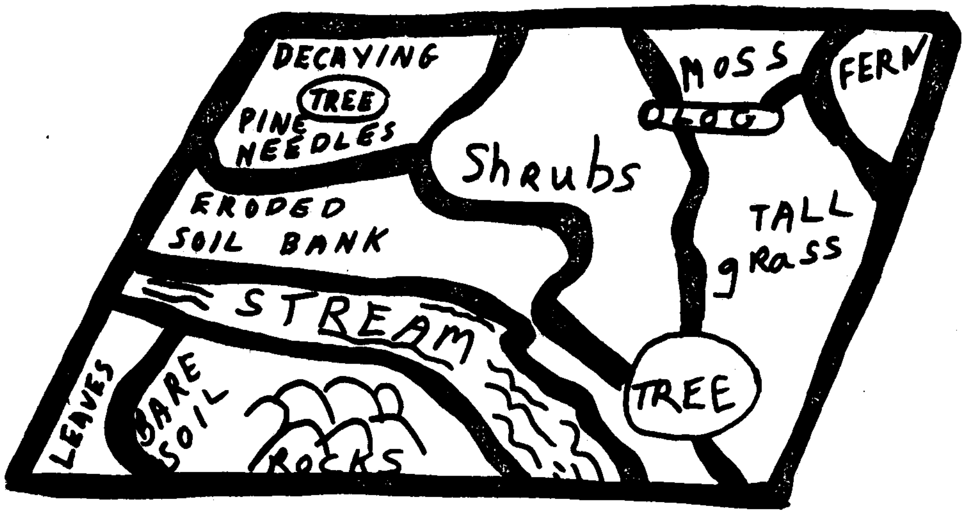
Divide the class into groups of two or three. Have each of them select their own area north, south, east, or west of the landmark. If additional teams are available you may want to assign them to certain areas which are rich in diversity.

Once they have identified a specific area have the students outline (using natural features) the section they will survey. Within the imaginary lines is the community which they are to study.



A. Recording the Various Types of Families in the Natural Community:
   1. On a blank sheet of paper students should map and locate the various types of plants and animals found in the area they are surveying. It may be in detail or in generality (see Figure A) but it is important to map out the general natural community involved.

Figure A.



Upon completing the mapping, the students should specifically identify the arious types of trees, shrubs, grasses, etc., and animals that live within the iven community. This may involve using a key to plant and animal life.

I Students should then select two or three families in the community to interview (using the attached questionnaire). In all cases, the students should try to accurately answer the questions on the 'work sheet', utilizing a sensory approach to develop the answers.

II Discussion of Activity:

We have selected a community in the forest to study -- now we should talk about its functions.

Discussion of Plants -- How many types of plant families live in this family community?
Are there more tall plants than short plants or vice versa?
Is there any special reason why?
What are the needs of this plant for survival (food, water, air, shelter)?
Where do the plants get their food in this community?
Do any other plants or animals get their food from the same source?
Where do the trees find shelter?
How are they protected from the cold and wind?
Is a tree's protection different to that of a blade of grass?
How does the tree help the air to stay 'fresh' in the community?
Do they help each other in any way (moisture, light, etc.)?
If plants are absent in any part of the community, how does that area differ to the area where they are present (teacher can expand discussion to include a soil study, light needs in the given area, photosynthesis, necessity of space for growth, and so forth)?

iscussion of Animal Families

ow many types of animal families were in the community you surveyed?

eacher: Develop a student discussion on the food these animals eat.
Develop a student discussion around the water these animals drink.
Develop a discussion on the types of homes the animals live in and on their methods of selecting these homes.

ow many animals can you find living on plants?
ow many types of animals in your community eat plants for food?
o the animals in your community get along well with each other?
ow much land would you estimate that each animal has as its own backyard?

acher: You can expand discussions through the development of food chain, food webs, inter-relationships between plants and animals, survival, means of protection of various organisms, adaptation to environment, and so forth.

o you think this was a healthy community -- and if so -- what do you feel makes good strong community.

FIELD QUESTIONNAIRE
for
NATURAL COMMUNITY PROFILE STUDY

. Briefly describe the area or object which you will be surveying in the following questionnaire.

. How long has the subject been here?
. How old is the subject?
. Do plants or animals live on the subject?
Is the subject mobile or immobile?
. Where does the subject get its food?
. What are its means of protection?
. Why is the subject located in this area?
(for food, water, shelter, space, or what?)

HINGS TO NOTICE ABOUT THE SUBJECT

1. Are there more of the same subject in the area? Yes_____ No_____
2. Is the subject in good shape? Yes_____ No_____
(if no, explain why)

3. Could man help the subject to improve its way of life? Yes_____ No_____
4. What is the subject made of?

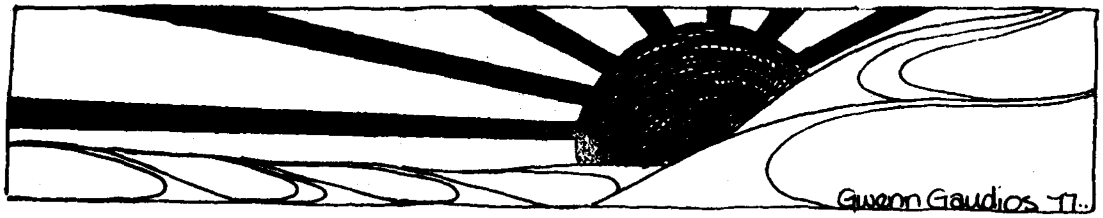
5. If applicable: What kind of home does it live in (trees, ground, water)?
6. If applicable: What type of path leads to its home?

7. If applicable: Is there any natural protection around its home?
Yes_____ No_____
8. If applicable: Is there any man-made protection around its home?
Yes_____ No_____
9. If applicable: Does the subject produce any type of litter?
Yes_____ No_____
0. If applicable: How many families live on or near the subject (within three feet of ground cover)?

SURVEY FOR NATURAL COMMUNITY PROFILE

GRADE LEVEL: K, 1, 2, 3

1. In a few words, tell about the thing you are looking at.
2. Do you think it is old or new?
3. Does anything live on it?
4. Can it move by itself?
5. Where does it get its food?
6. How is it kept safe?
7. Why is it found here?
8. Can you find more of these things nearby?
9. Do you think it is in good shape?
10. Could you help it have a better life?
11. What is it made of?
12. What kind of home does it live in?
13. What kind of path leads to its home?
14. Does nature keep it safe?
15. Does man keep it safe?
16. Does it make any kind of litter?
17. How many plants or animals live on or near it?



LEARNING EXPERIENCE: *COMMUNITY PROFILE*

CONCEPTUAL THEME: *The environment of an urban community has many diversified features.*

OBJECTIVES: Upon completing the activity, students will be able to:

(1) Differentiate between the types of people in the area surveyed.

(2) Differentiate between the variety of needs which people have in the surveyed area.

(3) Discover the importance of components, such as transportation, business, etc., in helping to keep the community alive.

(4) Identify the role of the student as an individual within the community.

UNIT CONCEPTS:

(1) Within a community, we can identify groups of individuals on the basis of age, employment, race, and ethnic background.

(2) Within a community, we can identify the economic needs, such as food, water, clothing, and shelter, that are basic to individual survival.

(3) Urban communities have various man-made systems which help urban areas to function (such as roads, sewers, telephone, heat and light, etc.).

(4) Each individual has his or her own niche in the urban community environment.

PLANNING YOUR SURVEY:

You could: survey every third section -- or -- survey four structures in each block at random.

Decide on the numbers and locations, and make sure each team does the same.

Will you do both sides of the street?

Who will ask the questions at each place? You will probably want to take turns.

KEEP IN MIND!

How much time you will have.
It is best NOT to enter a house.
You are representing a professional group.
People will be happier to answer your questions if you are courteous.

PRACTICE:

Interview your friends.
Have them pretend to be difficult or talk about things you don't ask.
You can expect some people you survey to be this way.

COMMUNITY PROFILES:

This section presents a framework for an active community investigation by the students. The studies could be focused on real problems in the community.

The "work sheets" on the pages that follow are written for the students. These can be duplicated and given to them as a small booklet, if you desire. The annotations on the top of each page are for your use in guiding the section.

In this section, the students will learn things about the neighborhood around the school -- about the people who live and work there and the types of homes and businesses they might find. To do this they will want to make a survey. But it is impractical to survey every dwelling or business in the community. Instead, they will have to take samples. The sampling method can be compared to a poll, such as the Gallup Poll and the Harris Survey, which do not contact all people but do give reliable surveys of public opinion.

Instead of surveying every home within a five block radius of the school, the class could, for example, plot imaginary lines from the school in various directions and survey all the buildings along these lines. If the students want, the could have these lines cut across back yards and through the middle of houses. From a practical standpoint, however, this would obviously be inconvenient to the homeowners and would make the survey harder for the students. A simpler method would be to have the lines run along the streets. This way, the students could canvass the people on both sides. If they use this method, they will be doing what is called a "transect study". When the investigation is completed, they will have gained some information about various aspects of the community.

The results of the study should be displayed with maps, pictures, and lorful histograms. The students should be able to interpret these easily.

ANSECTS:

Make a map of your designated area.

Draw four lines in different directions from the centre of the area (to be nonstrated on chalkboard in classroom).

The transect line will be your guide. It will help you to decide where to nduct the survey and what each team member in the survey will do.

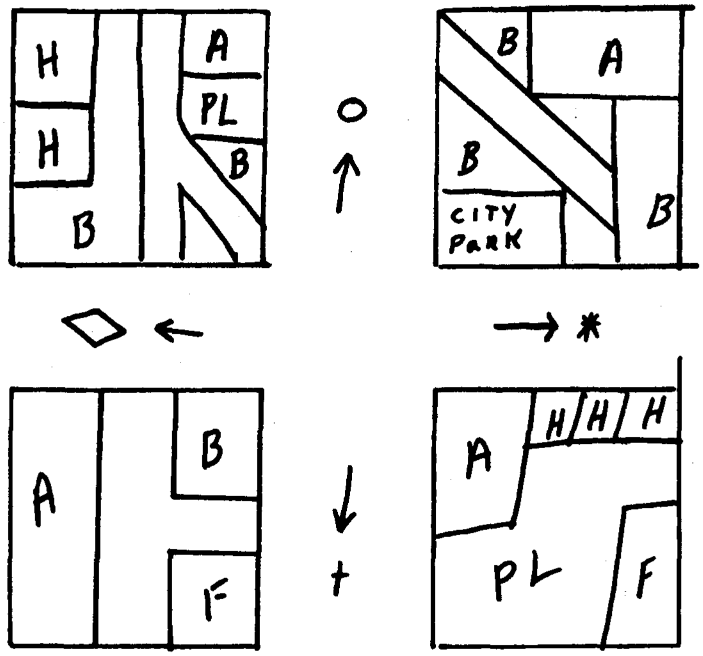
The class will be divided into four groups:

North	0	East	*
South	+	West	▱

Make a map of your group's transect:

The map should show the street which the transect follows and all the reets which cross the transect. Place in street names. Indicate where all e buildings are along the transect; showing houses - h, apartments - a, sinesses - b, and so forth. Prepare a map legend.

= business
= factory
= apartments
= home
= park
= parking lot



NOTES TO THE TEACHER:

This section is optional, depending upon the availability of cameras. The school may have some. Polaroids are ideal, since they give instant results.

If only one group goes out at a time, one camera will suffice.

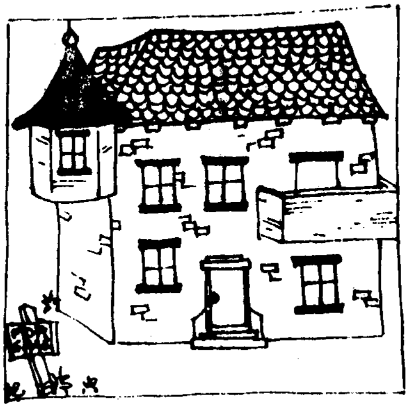
If the students offer to bring a camera from home, you might check with their parents for permission. One camera per group is ideal. To ensure return of the pictures, the school should supply the film and developing.

The class is now ready to go out. The number of necessary trips will depend upon available time and the length of the transects.

PICTURES - SHOW OTHERS

If cameras are available you can photograph the places you survey.
Practice using a camera. Decide who will take certain pictures.
Take the picture after you talk with the people.
Keep a list of the order of the pictures in the camera as you take them.
If there is any possibility of confusing one building with another, keep notes to help keep the pictures and houses in order after they come back from the developer.

PICTURE NO.	SUBJECT	LOCATION
1	Old House	325 Elm
2	Apartment	327 Elm
3	Garage	329 Elm
4	Old House (dog in yard)	333 Elm
5	Vacant lot	--
6	House (under construction)	347 Elm
7	Old House (For Sale sign in yard)	349 Elm



NOTES TO THE TEACHER:

The pictures can be grouped in ways which emphasize the aspects studied, or the students can put their pictures together.

A group discussion can be based around the pictures.

Possible discussion questions:

Why are these places dangerous?
What makes these places safe?
What would you do to make the dangerous places safer?

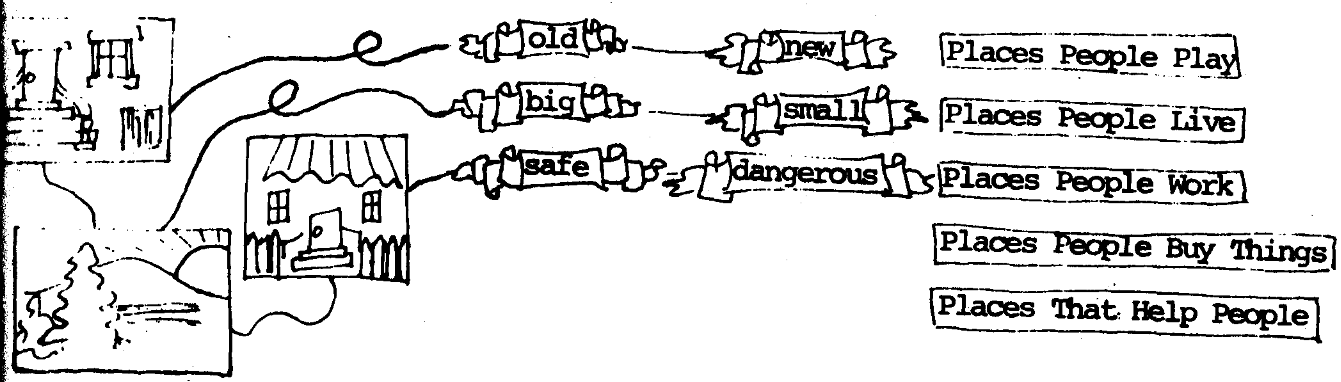
You will want to develop questions which pertain directly to your specific study.

WHAT CAN YOU DO WITH THE PICTURES?

rrange them like
a string map

Contrast them

Group Them



OTES TO THE TEACHER:

Point out that the scale on the left of this histogram is different and tands for a different thing.

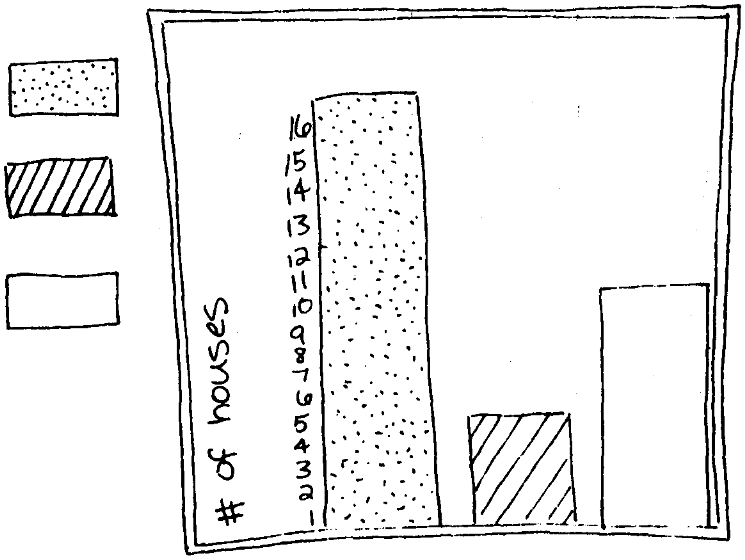
Ask the students to interpret the key this time.

What does the dotted bar stand for?
What does the lined bar stand for?

Histograms can help in interpreting results but they do not always give learcut answers. This one indicates (a) and (c) but not (b). Lead the tudents into a debate over the "right" answer until they discover there is more han one answer. After this discussion, the various interpretations of their wn histograms should become more apparent.

MPARING AGE OF HOUSES:

A histogram showing es of houses can indicate t a glance how old most of e houses are along your ansect. You may find that ery house along your ansect was built at approximately the same time. this is the case, your stogram may have only one two upward columns rkened in. The houses long other transects may ve a wide variety of ages d the histograms can be ed to show this variety.



KEY:

Houses 20 years old or more.

Houses ten years old but less than 20 years old.

Houses less than ten years old.

What does this historgram tell you?

a. Most of the houses here are old.

b. Most of the houses here were built between ten and 20 years ago.

c. Many new houses have been built in the last ten years.

NOTES TO THE TEACHER:

Even if you haven't made up booklets for the students, you may want them to have copies of this page and the next one. You could make a transparency of the sample histograms as a centre for class discussion.

Ask the students to interpret the samples, and explain why they give the answers they do. Example:

> *"The answer is (b) because the biggest bar is for the people who have lived here a long time."*
>
> *"It isn't (a) because the smallest bar is for the new people."*

Point out the scale on the left of the histogram and explain what it means. You may also want to help them with the key.

HISTOGRAM

Comparing Length of Residence

Make histograms of the different things you surveyed that you can count.

Here is an example, but make your graphs to fit your results.

KEY:

People living here more than ten years.

People living here more than five years, less than ten years.

People living here less than five years.

What does this histogram tell you?

a. Most of the people here are new.

b. Most of the people here have lived here a long time.

NOTES TO THE TEACHER:

The results of the survey should be tabulated before making the histograms. The sample survey summaries in the back of the book can be used as a pattern. However, the conclusions (the summaries of data) should not be drawn until the histograms are complete.

Guide the discussion of the real histograms along the lines of the sample ones.

Write down each conclusion or interpretation. These can be attached to the bottom of each histogram.

The students will probably decide that the class histograms give a better picture of the community as a whole. However, some students will say that their section of the area was not like that, so their histogram is more accurate. Both sides are correct. The whole is the sum of its parts, but these parts are not all alike.

SUMMARY OF HISTOGRAMS:

Decide what your histograms tell you. Compare them with the histograms of the other groups. Do they all tell the same thing?

Get together with the other groups and make big histograms by putting your results together. What do these big histograms tell?

How do the big histograms compare with the ones made by the separate groups? Which ones give a better picture of the whole community? If you had done some of the same surveys ten years ago do you think the results would be about the same? Would they be different and if so, in what ways? Would your city government have any information that would show you what certain residential areas were like ten years ago? Suppose you were to do similar surveys ten years from now. Can you predict what those surveys might show? For example, are new families tending to live in your town for shorter periods of time than they used to?

Your city government might have made studies on how long individual families tend to remain in your town or city. There might also be predictions of whether present trends will tend to change in the future or remain the same. Your city hall may be able to provide you with information.

EARNING EXPERIENCE TITLE: *BIOLOGICAL AQUATIC STUDIES*

UDIENCE AND/OR GRADE LEVELS: Special Education/Learning Disabled
Minor limitations for vision impaired

URRICULUM AREA: Science

ONCEPT: Theme of Learning Experience:
Freshwater communities have many things living and growing in and around them and how the chemical nature of water affects this life.

BJECTIVES: After the completion of these activities participants will be able to:

(1) Determine what forms of life are present in a stream or pond.

(2) Acquire an understanding of the biological and chemical nature of water.

(3) Demonstrate the use of their senses.

ONCEPTS:

(1) The stream contains various habitats.

(2) Many forms of life live in a stream.

(3) Life forms vary according to the chemical composition of the water.

(4) Freshwater habitats are natural environments in which communities of both plants and animals live.

(5) We should try to disrupt natural bodies of water as little as possible because we are disrupting a natural community of living things who make their homes in the water.

(6) Some animals are so tiny that we must use magnifying instruments to see them.

PLANATION OF ACTIVITY:

Stream Survey

ATERIALS:

Nets, trays, eye droppers, microscopes, hand lenses, field guide books, pH kit or litmus paper, papers, and pencils.

FIELD WORK:

1. What signs of life do you see along and in the stream?
2. What things do you see floating on the surface? Below the surface?
3. Compare deeper areas of the stream with more shallow areas. List ways they are alike and different.
4. Turn over rocks and dig in the bottom portions of the stream to find aquatic life. (Be sure to replace the rocks once you have examined them. Remember, it's their home.)
5. Feel the rocks above, then below the water's surface. Describe how they feel. Explain the differences.
6. See how many different kinds of aquatic life you can find. Examine smaller ones with hand lenses or microscopes.
7. Check the pH of the water. Is it acidic or basic? What could affect the pH of water?

FOLLOW-UP:

1. Complete a list of the organisms found in the stream.
2. Identify the food habits of the organisms.
3. Draw a food chain using the organisms found in the field work.

ARNING EXPERIENCE TITLE: *SIMPLIFIED WEATHER STUDY*

DIENCE AND/OR GRADE LEVELS: Varies according to teacher requirements
Minor limitations for learning disabled

RRICULUM AREA: Science, Social Science

NCEPT: Theme of Learning Experience:
Weather is made up of heat, moisture, wind, and air pressure.

JECTIVES: After the completion of these activities participants will be able to:

(1) Determine the effects of heat, moisture, wind, and air pressure on weather.

(2) Demonstrate an ability to measure temperature, precipitation, wind speed and direction, humidity, and barometric pressure.

(3) Acquire an understanding of the importance of observation and measurement when studying weather.

(4) Describe the components of the water cycle.

NCEPTS:

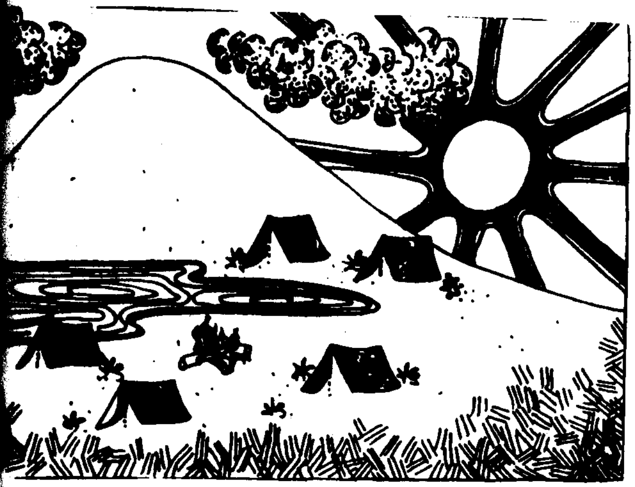
(1) A layer of air known as the atmosphere surrounds the earth.

(2) Air has weight.

(3) Wind is moving air; differences in air pressure cause the air to move.

(4) Wind brings changes in weather; wind moves at various speeds.

(5) Precipitation is water that falls to the earth in the form of rain, snow, sleet, hail, or dew.



(6) The temperature of air influences weather.

(7) Warm air expands, cool air contracts.

EXPLANATION OF ACTIVITY: The Collapsing Can.

MATERIALS:

Water
Ice cubes
Gallon can
Measuring cup
Hot plate

PROCEDURE:

1. Put 1 cup of water in the can.
2. Place can on hot plate, allow water to boil.
3. When steam rises, cap the can and remove the can from the hot plate.
4. Rub ice cubes along the sides of the can.

OUTCOME AND EXPLANATION:

1. The can collapses.
2. Air pressure around it pushes on its sides; air pressure outside is greater than inside.
3. Steam pushes air out of the can; ice changed the steam back to water, thus there was neither air nor steam inside the can.

EXPLANATION OF ACTIVITY:

Egg in the Bottle

MATERIALS:

Glass milk bottle
Small hard boiled egg
Pieces of crumpled paper
Matches

PROCEDURE:

1. Light the crumpled paper and drop into the bottle.
2. When the paper is almost out, set the egg on top of the bottle, covering the opening.

OUTCOME AND EXPLANATION:

1. The egg squeezes into the bottle.
2. The burning paper used up the air in the jar, reducing the air pressure inside the bottle.
3. The air pressure outside the bottle pushing on the top of the egg was greater than that of the pressure pushing up on the bottom of it.

EXPLANATION OF ACTIVITY:

Making Snow

MATERIALS:

Ice, salt, aluminum pan, something to crush the ice, hand lens.

PROCEDURE:

1. Crush some ice.
2. Pour salt between layers of crushed ice.
3. Place the ice-salt mixture into an aluminum pan -- let stand for a while.
4. Observe, with a hand lens, the "snow" on the outside of the pan.

OUTCOME AND EXPLANATION:

1. The air that comes close to the pan containing the ice-salt mixture gets cold and chills rapidly.
2. The water in the air changes from water vapor (a gas) to ice crystals, or "snow".

EXPLANATION OF ACTIVITY:

Wind

MATERIALS:

Stick, string, paper, scissors, hot plate.

PROCEDURE:

1. Cut a spiral ribbon out of a sheet of paper.
2. Suspend the paper spiral over a hot plate, using the string and stick.

OUTCOME AND EXPLANATION:

1. The air above the hot plate is warmed.
2. Cold air is heavier than warm air.
3. The cold air beyond the hot plate sinks and moves into the area of the hot plate.
4. The warm air above the hot plate rises and produces an up-drift. This turns the spiral.

FOLLOW-UP:

1. Set up and maintain a simple weather station.
2. Record, on a daily basis (making readings three times a day), barometric pressure, temperature, precipitation, etc.
3. Set up a weather map and follow T.V. forecasts on a national level.

EARNING EXPERIENCE TITLE: *LANGUAGE ARTS IN THE ENVIRONMENT*

UDIENCE AND/OR GRADE LEVELS: Primary/Intermediate; Special Education

URRICULUM AREA: Language Arts

ONCEPT: Theme in Learning Experience:
Ideas, feelings, and a general awareness of the out-of-doors can be communicated through a variety of language arts oriented activities.

JECTIVES: After completion of these activities the participants will be able to:

(1) Improve their writing skills.

(2) Improve their reading skills.

(3) Improve their verbal communications skills.

XPLANATION OF ACTIVITY:

Outdoor Adjective Hunt

1. Find objects to fit different descriptions.

2. Example:
    a. Soft - moss
    b. Sharp - rocks, pointed sticks
    c. Rough - bark

3. Make up a list of adjectives and hunt for objects to fit them.

4. Emphasize the importance of replacing all things to their proper place in nature with the least amount of disturbance.

XPLANATION OF ACTIVITY:

Sounds of Nature

1. Blindfold each participant.

2. Distribute cards with various kinds of animals written on them.

3. Whisper the name of the participant's animal to him so only he knows what animal is on his card.

4. Explain to the group they are to arrange themselves in a line from smallest to largest animal. They will be timed.

5. Participants may only communicate by making the sound of their animal.

6. Stop timing when the group decides they are finished; add one minute to the score for each incorrect animal.

EXPLANATION OF ACTIVITY:

Nature Knows

1. Make a chart like the one below:

	Mammals	Flowers	Trees	Birds	Fruits/Veg.	Non-Living Member
N						
A						
T						
U						
R						
E						

2. Pass out charts to participants.

3. Have participants fill in the chart using dictionaries, encyclopedias, etc.

4. Example: Under "Trees" follow the "A" in NATURE, a tree starting with the letter "A" -- apple, aspen, etc.

EXPLANATION OF ACTIVITY:

Know a Tree

1. Have each participant select a tree of his own.

2. Periodically observe the tree and keep a record in diary form.

3. Write comparisons related to seasonal changes.

XPLANATION OF ACTIVITY:

Hula Hoop Toss

1. Take a Hula Hoop and toss it outdoors.

2. List the living and non-living things found inside it.

3. Write or tell stories suggesting how these items affect each other and how the items came to be in that specific spot.

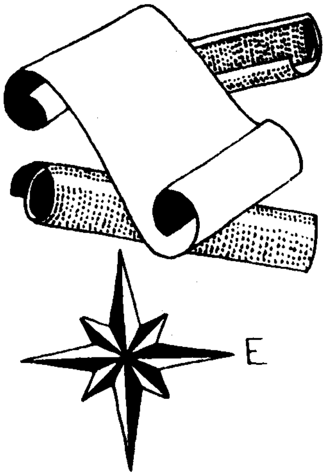
XPLANATION OF ACTIVITY:

Nature Interview

1. Have participants select an object in the outdoor environment to interview.

2. Use an activity sheet to answer these questions:

   a. In a few words, tell about the things you are looking at.
   b. Do you think it is old or new?
   c. Does anything live on it?
   d. Can it move it itself?
   e. Where does it get its food?
   f. How is it kept safe?
   g. Why is it found here?
   h. Can you find more of these things nearby.
   i. Do you think it is in good shape?
   J. Could you help it make a better life?
   k. What is it made of?
   l. What kind of home does it live in?
   m. What kind of path leads to its home?
   n. Does nature keep it safe?
   o. Does man keep it safe?
   p. Does it make any kind of litter?
   q. How many plants or animals live on or near it?



XPLANATION OF ACTIVITY:

Scavenger Hunt

1. Have participants divide into teams of two or three.

2. One person wears a can around his waist with the can to his back -- he is a hunter and receives but cannot pick up or put anything into the can; this is done by the other participants.

3. Each team has a prepared list of things to find and place into the can.

4. After a set time call the teams together, determine who has reached the goal and declare a winner.

5. Remove the objects and see how each team categorizes the items they found.

6. Discuss various means of categorizing things such as: shape, size, color, composition, etc.

EXPLANATION OF ACTIVITY:

Nature Slide Mounts

1. Have prepared 2 X 2 inch pieces of contact paper and slide mounts.

2. Have participants place various items found in nature between the contact paper and slide mount.

3. Project onto a screen for discussion.

4. Select one or two for creative writing topics.

EXPLANATION OF ACTIVITY:

Signs of Spring

1. Have participants take a walk through the woods observing as many different signs of spring they can.

2. Make a list of these signs.

3. Discuss each list as a group.

EARNING EXPERIENCE TITLE: *BUILDING SIMPLE WEATHER EQUIPMENT*

UDIENCE AND/OR GRADE LEVELS:
a) Primary/Intermediate
b) Learning Disabled
Minor limitations for learning disabled

URRICULUM AREA: Science

ONCEPT: Theme of Learning Experience:
Simple weather equipment can be constructed with minimal cost adding fun and interest to understanding weather forecasting.

BJECTIVES: After the completion of these activities, participants will be able to construct the simple equipment necessary for establishing a school weather station.

ONCEPTS:

(1) Heat, mositure, wind, and air pressure determine our weather.

(2) Heat can be measured after construction of a simple thermometer.

(3) Moisture can be measured after construction of a simple rain gauge.

(4) Wind can be measured after construction of a simple anemometer.

(5) Air pressure can be measured after construction of a simple barometer.

XPLANATION OF ACTIVITY:

Making a Thermometer

ATERIALS:

Red food coloring
Water
Glass tube and stoppered bottle
Piece of cardboard

ROCEDURE:

1. Place the food coloring in the water.

2. Put the water in the bottle.

3. Push the glass tube through the hole in the stopper.

4. Place the stopper in the mouth of the bottle.

5. Place a piece of cardboard behind the glass tube.

6. Calibrate the thermometer by comparing it to another thermometer and place the readings on the cardborad.

EXPLANATION OF ACTIVITY:

Making a Rain Gauge

MATERIALS:

Gallon paint can
Olive jar
Ruler
Marker

PROCEDURE:

1. Pour 1 cm. (or 1 inch) of water into the gallon can.

2. Pour the 1 cm. (or 1 inch) of water from the gallon can into the olive jar.

3. Mark the water level on the jar.

4. Continue with other markings.

5. Place the gallon can outside during a rainfall. Let water collect in the can, then pour it into the jar for measuring.

EXPLANATION OF ACTIVITY:

Making an Anemometer

MATERIALS:

4 paper cups
A drill
Some brads
A medicine dropper
A coat hanger
2 strips of wood
A block of wood

PROCEDURE:

1. Cut a piece of wire from the coat hanger.

2. Use the block of wood for the base.

3. Bend the wire to form an "L". Fasten the L-shaped wire to the base by nailing the brads over the short section of the "L".

4. Put the strips of wood together forming a plus "+" and nail together.
5. Drill a hole through the centre of the "+" and run the medicine dropper through the hole.
6. Close one end of the dropper by heating it, then place it over the wire holder.
7. Fasten the cups at the ends of the wood strips; the cups will now turn freely in the wind because the medicine dropper allows them to swing freely.
8. Paint or mark one of the cups.

IELD WORK:

1. You will have to compare the anemometer with a known wind speed.
2. Wait for a day with a gentle wind (one which keeps leaves moving on the trees all the time: a gentle wind moves at about 10 mph).
3. Now count the number of times the colored cup goes around in one minute.
4. You now know the rate for your anemometer.

Example:

Suppose it made 18 turns in 1 minute.
Your rate for a 10 mph wind is 18 turns.
Another day it might turn nine times in 1 minute,
thus you have a 5 mph wind.

XPLANATION OF ACTIVITY:

Making a Barometer

ATERIALS:

Tin can, broom straw or soda pop straw, rubber band, a piece of saran wrap large enough to cover the top of the can, a piece of white paper, a paper clip, tape.

ROCEDURE:

1. Place the saran wrap over the top of the can and hold tight with a rubber band.
2. Wrap the piece of paper around the can so part of it is higher than the top of the can, and tape it in place.
3. Attach the straw to the middle of the saran wrap with glue or tape.
4. Mark the position of the straw on the paper with a paper clip, and watch to see if the straw moves up or down.

5. Mark "High and Low" above and below the straw.

6. If the straw moves toward the high, the weather will be fair; if the straw moves toward the Low, there is a storm coming.

FOLLOW-UP:

1. Use the instruments to set up a school weather station.

2. Make daily observations three times a day and keep accurate records.

RELATED ACTIVITIES - WEATHER

ANGUAGE ARTS:

Both prose and poetry have been written with some element of weather as heir central theme.

a. Have the class read stories where the weather plays an important part in the development of the story.

b. Read poetry about the weather.

c. Let the students write their own poetry. Ideas such as: windy day, rain, and snow.

Good stories can be found in collections of Jack London's stories, while ou Come Too by Robert Frost is an excellent source for poetry.

Three examples of poems about weather are:

FOG

The fog comes on little cat feet,
it sits looking
over harbor and city
on silent haunches
and then, moves on

Carl Sandberg

WHO LOVES THE RAIN

Who loves the rain
And loves his home,
And looks on life with quiet eyes,
Him will follow through the storm;
And at his hearth - fire keep me warm;
Nor hell nor heaven shall that soul surprise,
Who loves the rain,
And loves his home,
And looks on life with quiet eyes

Frances Shaw

RAIN

The rain is raining all around,
It falls on field and tree,
It rains on the umbrellas here,
And on the ships at sea.

Robert Louis Stevenson

Have the class try writing this:

Whether the weather be cold,
Whether the weather be hot,
Whether the weather be fair,
Whether the weather be not,
We'll weather the weather
Whatever the weather
Whether we like it or not.

WEATHER LORE

The weather has influenced man since the beginning of his existence. It plays a part in everything he tries to do. To help predict the weather certain sayings were formulated. A study of weather lore can be centred around trying to prove the validity of the statements or the history of modern practices in weather prediction.

When bees stay close to the hive,
Rain is close by.

The higher the clouds, the better the weather.

When the dew is on the grass,
Rain will never come to pass;
When the grass is dry at morning light,
Look for rain before the night.

Flies bite more before the rain.

Cobwebs on the grass are a sign of frost.

Rain long foretold, long last;
Short notice, soon past.

Rainbow in the morning
Shepherd take warning;
Rainbow toward night
Shepherd's delight.

When smoke descends, good weather ends.

When the stars begin to hide
Soon the rain it will betide.

If a ground hog sees his shadow on the second of February, six more weeks of winter.

Dark clouds in the west --
Stay indoors and rest.

When teeth and bones and bunions ache
Expect the clouds to fill the lake.

EARNING EXPERIENCE TITLE: *ACCLIMATIZATION*

UDIENCE AND/OR GRADE LEVELS: Primary/Adult

URRICULUM AREAS: Science, Social Studies, Language Arts

ONCEPT: Theme of Learning Experience:
Awareness is an ongoing wholeness; it is a knowing growth. "Natural" awareness is a many-sided quality. With undisturbed preception, we can enter a world where the familiar becomes unfamiliar, the ordinary the miraculous.

BJECTIVES: After the completion of the activity, participants will be able to:

(1) Observe the overall aspects of a scene.

(2) Examine things from varying viewpoints.

(3) Use all senses to fuse the facets of awareness.

(4) Look for small things.

(5) Let the natural world engulf you.

ONCEPTS:

(1) These activities foster the idea that natural resources are not things but communities.

(2) The activities emphasize a concern about essential concepts of ecology.

(3) Individual growth and development are fostered.

(4) Self awareness follows natural awareness.

KPLANATION OF ACTIVITY:

Journey Through the Forest

ATERIALS:

Blindfolds
Long Rope

ROCEDURE:

1. Blindfold each participant.

2. Spread the rope out and give each a place along it; do not move up or down the rope, keep your place. Keep the line taunt, but without pulling.

3. Tell participants it is to be a quiet walk, increasing all senses.
4. Stop and listen a few times, freeze and listen.
5. Sit down, feel the area around you.
6. Take off blindfolds and discuss your experiences.

Two excellent books in this area are: "Acclimatizing" and "Acclimatization". Both were written by Steve Van Matre and are published by the American Camping Association, Bradford Woods, Martinsville, Indiana 46151.

LEARNING EXPERIENCE TITLE: *INSECTS AND PLANTS*

AUDIENCE AND/OR GRADE LEVELS: Primary/Intermediate

CONCEPT: Theme of Learning Experience: *Organisms are interrelated and interdependent.*

OBJECTIVES: After completing this activity, students should be able to:

(1) Locate at least five evidences of insect activity on plants.

(2) Describe ways that insects use plants and what effect this has on the plant.

(3) Explain effects of insecticides on insects and other organisms.

CONCEPTS:

(1) Insects use plants for food, shelter, and laying eggs.

(2) The use of insecticides can upset the ecological balance.

(3) Insects change plants by enlarging or destroying parts of the plant.

ATERIALS:

Magnifying glasses
Insect identification books

IELD ACTIVITY:

What evidence can you find of insects using parts of plants for food? For helter? For laying eggs or bearing young? What parts of the plants have been sed? Does the insect change the plant in any way? Does it enlarge a part of e leaf or stem? Does it destroy part of the plant? What part? Has this ange affected this plant or this part of it? Which do you think is more maging: eating a part of a leaf or boring a hole in a fruit? From whose int of view? Is this true in all cases? Has the insect used the plant as a undation for making a cocoon, web, etc.? In doing this, has the insect anged the appearance of the plant. How?

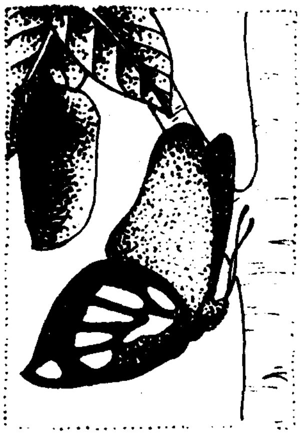
Investigate any galls or other evidences of insect alterations on plants. (Example: foamy white bubbles. These are produced by an insect called a spittle bug. It sucks the juices from a plant stem and mixes them with air to make the bubbly mass in which the young are hidden.) (NOTE: Be sure to have children examine aspen and oaks carefully and the stems of goldenrod. If there are cherry trees or witch-hazel bushes in the area, these are also good subjects for investigation.) Describe the gall or web or whatever it is you have found. What is the shape? Texture? Size in relationship to a familiar object? Is it solid? Is it hollow? Does the insect appear to be within? What makes you think this? Can you suggest a name for this gall or for the insect that made it? Can you find any examples of insects which are helpful to plants? How is this insect beneficial to the plant? What makes you think this? Have most of the insect activities you have observed today been beneficial to or harmful to the plants? Would people consider these activities beneficial or harmful? Why? What would happen if DDT or another insecticide were sprayed on this field? Would this be good or bad? From whose point of view? If an insecticide were used harmful to chewing insects, but not to insects which gather nectar from flowers, would this be all right to use? Why? (NOTE: If children think this would be acceptable, suggest some of them do research on life cycles of butterflies.) What would happen to insects if humanity and insecticides disappeared from earth? What would happen to the earth, the vegetation, and other animals? What would happen to humanity if all the insects disappeared.

EARNING EXPERIENCE TITLE: *LISTENING TO AND LOOKING AT INSECTS*

RADE LEVEL: Intermediate

ONCEPTUAL THEME: *Insects are adapted to live in all types of areas.*

BJECTIVES: After completing the activity, students should be able to:



(1) Describe the appearance of insects observed, noting characteristics which seem applicable to a number of species, and noting characteristics which, while often associated with insects, are not shared by all species.

(2) Pick out at least three sounds made by insects, differentiating them either by identifying the insects making them, or by describing them with appropriate adjectives.

(3) Describe ways insects are adapted to live in different habitats.

NIT CONCEPT:

(1) Insects have six legs and three body divisions.

(2) Sounds made by insects are produced in a variety of ways, thus creating a variety of sounds.

(3) Insects have adapted various body parts to best suit the habitat in which they live. These adaptations include: flight, locomotion, mouth parts, size, and coloration.

ATERIALS:

Thermometer, stop watch, clear containers for observation, reference books on insects.

IELD ACTIVITY:

Where can you find insects? Would you expect to find many insects here? o you expect to find more flying or non-flying insects. Are there any insects n the leaf litter? Are there any insects in the crevices of tree trunks? Did ou find any cocoons (if so, describe them. If not, can you guess why not)? hat will come out of the cocoon later? How much later? Did you find any soil welling insects? Did you find the dwelling itself?

Listen for the sounds of insects. Can you follow one of the sounds and ind the insect that is making the sound? What happens when you approach the nsect? Why do you think this happens? How might you get the insect to start aking the sound again? Can you find out how the insect makes the sound you eard?

Do you hear any insect sounds from farther away? Does the sound seem to be made by one insect or by a chorus of insects? What makes you think so? Can you use words to describe the sounds of insects? Which ones are repetitive? Buzzing? Clicking? Can you make up words that go with the sound (such as "Katy-did, Katy-didn't")?

What do you hear when you hear insects flying around you? What part of a bee makes the buzz? Do all insects sound alike when they fly? Can you think of words to describe the sounds various insects make flying?

You can tell the temperature by the chirp of the snowy tree cricket (Oecanthus niveous). Count the number of times a cricket chirps in 15 seconds. Add 40. This will give the Fahrenheit temperature. All crickets chirp more rapidly when it is warmer. Can you determine a formula for finding the temperature based on the number of times per minute a field cricket chirps?

Look for insects. Where would you look (allow time for suggestions, and then for some investigations)? Did you find insects where you expected to?

How do the insects you found move? Do they fly? Crawl? Hop? How are their legs arranged? Does this seem to have any relationship with the way they move? How many legs does the insect have? How many parts does the insect's body seem to have? To which part are the legs attached? The wings (if you can find wings)? How many eyes does the insect appear to have? What is the proportionate size of the eyes to the rest of the head? The rest of the body? How does this compare with your eyes and your head? Look at the insect's mouth. Does it have a mouth adapted for chewing? For sucking? For something else? What makes you think what you do? Does the insect have a tongue? Where is it? Try to describe it. Does the insect you found have antennae? Does your insect have wings? How many? Can you find any insects that don't seem to have wings? Do all grasshoppers have wings? Do all winged insects have the same number of wings?

What color is a grasshopper? A cricket? Can you find an insect with spots? Stripes? Can you find an insect that is one color all over? How many different color combinations can you find on insects? Does the color of the insect seem to have any relationship to the place where you found it? Can you find an insect which can be camouflaged by color?

Rope off an area about one foot square. Try counting the number of insects in that area. About how many do you think there are in the whole field?

What will become of these insects during the winter? How can you find out? How do you think this species will survive till next spring? Can you find egg cases or signs of insect homes?

How might insects be helpful to plants? To animals? Are insects "good" or "bad"? Are all insects either good or bad? Should we bring some "bug spray" on our next trip? Why? If we spray the insects, will it hurt any other animals? What animals? Why do you think this? If we removed all the plants from the area, what would happen to the insects? If we removed all the insects, what would happen to the area?

LEARNING EXPERIENCE TITLE: *BIRDS: OBSERVING HABITS AND ANATOMY (also to be used as Guide for "Early Morning Bird Walk")*

AUDIENCE AND/OR GRADE LEVELS: Intermediate

CONCEPT: Theme of Learning Experience: *Birds fill an important niche in the Ecosystem.*

OBJECTIVES: After completion of activity, students should be able to:

(1) Describe birds as to color, size, shape, legs, beak, feet, voice, and action.

(2) Identify birds with the aid of a chart or book.

(3) Name the number of toes a bird has.

(4) Describe the difference between the male and female of the same family.

(5) Name three things that birds eat.

CONCEPTS:

(1) Birds vary greatly in color (blue, red, brown), size (ostrich to hummingbird), voice, and actions.

(2) Feet and legs are adapted for running, wading, perching, grasping, and hopping.

(3) Beaks are adapted for various types of food.

(4) Most birds have four (4) toes adapted for their habitat. Songbirds have three front and one rear for perching, woodpeckers two front and two rear for climbing, ducks webbed for swimming.

(5) In most species of birds the male is more brightly colored than the female.

(6) Birds' diets consist of seeds, insects, and rodents.

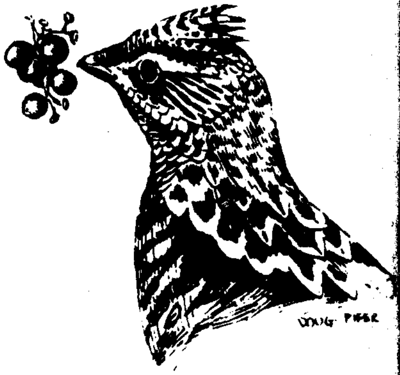
MATERIALS:

Binoculars
Field Guide to Birds (Peterson or Golden Nature)
Feathers

FIELD ACTIVITY:

Walk out from the starting point to a convenient area of "edge" -- the brushy area between woods and meadow -- or any area of low trees and bushy spots where birds could be expected to find shelter and food. Available water is also attractive to birds. On the way, a discussion of the habitat of various birds might be helpful.

Where might we expect to find birds?
What signs would you expect to find indicating there are birds in an area?
Would you expect to find ducks in this area? Why?
Would you expect to find hawks? Owls?
Name some of the birds you would expect to find.
Describe the places where you think these birds might live.
What do birds need for a comfortable life?
Does this area meet these needs?
What are some of the reasons you might not find the birds you expect to find?



(Do not try to find as many birds as fast as you can, but rather find a few which may be easily observed and watch them closely. Sometimes during fall migration, small birds exhibit marked curiosity and may approach the observers closely, if they are patient and do not make sudden moves or loud noises.)

Look carefully and quietly at the bird. What color is it? Is it all the same color? Streaky? Blotchy? What size is it? Base size on a comparison to known birds (crow size 20", robin size 10", sparrow size 6").

How far away from you is it? This might be checked roughly after the bird has flown. Can you see any obvious distinguishing features? Look especially for color patches, wing bars, eye lines. What simple descriptive words could you apply to the shape of the bird (thin, fat, chunky)?

Look now for the bird's bill. What is the general shape of the bill? To what tool, which you have used, might you compare this bird's bill? How is the bird using his bill? What clues do you find in the shape of the bird's bill, which might tell you about his food habits? What other uses has the bill? How does a bird chew his food?

Can you see the bird's feet? How many toes does it have and how are they arranged? (This will be difficult to observe but you might look for tracks in soft mud and then ask: How do we know these are bird tracks?) Do all birds have the same arrangement?

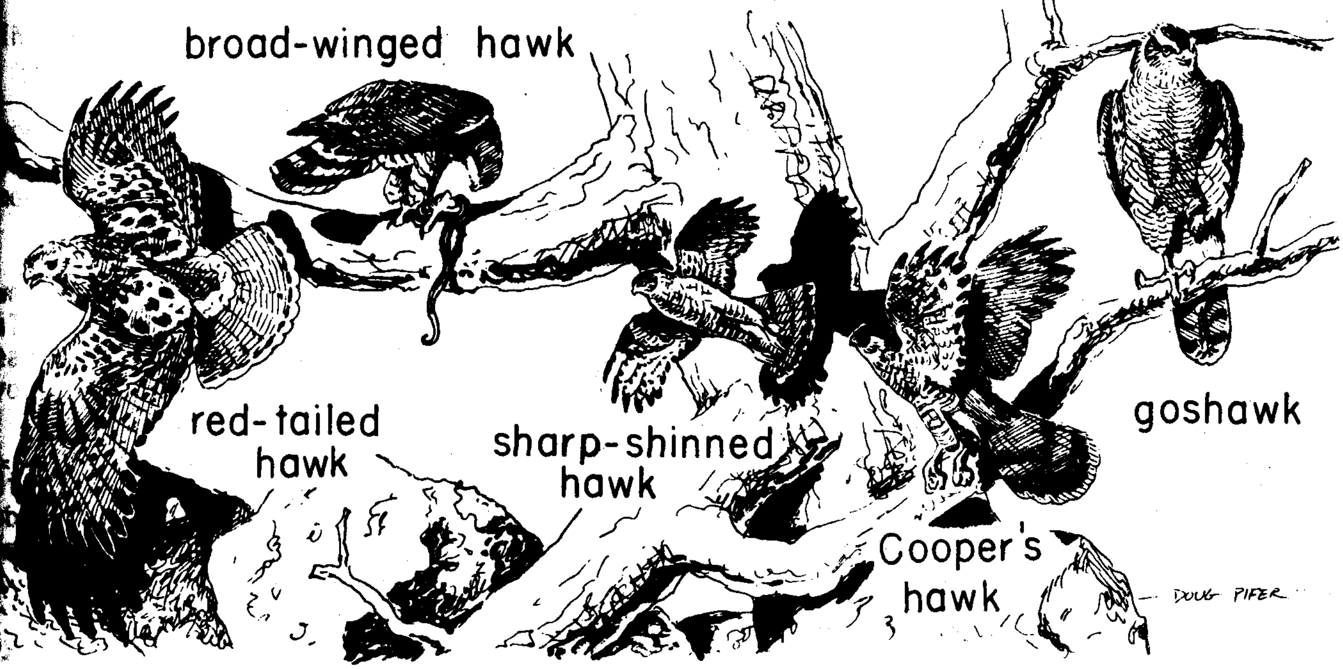
How does the bird use his feet? How do they compare to your feet or hands? (Think about this one: How do perching birds sleep? Could you sleep while your fingers held your weight on a branch?)

Observe the bird's movements and describe them. Do you notice any pattern the bird's movements? Does it do anything that appears unusual to you ing to the bark of the tree, hang upside down, fly out and return to the same ch, etc.)? How does it fly? Straight? Up and down? Gliding? Soaring? s it walk? Hop? Run? What noises does it make? Do birds have different ls? Why? What do you think they're trying to tell each other? (Try to tate them or put them into words.) (Birds are not as likely to sing in the l as they are in the spring, but careful listening may lead you to many ds.)

A FEEDER:

What do the birds eat? Do they all like the same kind of seeds? Do all ds eat seeds? Does the bird pick up the food and fly away? Does it eat the d at the feeder? How do they open seeds? Does any bird chase the others y? If people did not feed birds in winter, how and where would they get ir food?

Can you find any feathers? Do birds normally lose their feathers? What or(s) is the feather? If there is more than one color: what type of pattern the colors have? Is the feather in good shape or does it look worn? Which t is worn the most? How is the feather shaped? Can you tell from the shape t part of the bird's body it came from? Can you guess what type of bird it e from? Could it be from more than one type of bird?



EARNING EXPERIENCE: *FORM FOLLOWS FUNCTION*

RADE LEVEL: Intermediate/ Junior High

ONCEPTUAL THEME: *Mouth parts and food types -- or you eat what your mouth is made for.*

BJECTIVES: After completion of the learning experience, students should be able to:

(1) Identify and compare mouth parts of various animals by observing animals and discussing hypothesis with other students.

(2) Determine the preferred food of various animals through observation and discussion.

IT CONCEPTS:

(1) Animal mouth parts have evolved into many different forms. These adaptations limit what an animal is capable of eating.

(2) Some mouth parts are very specialized, such as in frogs; while others serve for a wide variety of foods, such as in man.

TRODUCTION:

Try and remember a few years ago when you were still an infant. What did u eat? Even later when your diet changed a little; in what form did you get ur food? Why were you so limited in your diet? What event in your develop- nt changed your eating habits?

Animals seem to have mouth parts which are related to their diet. In other rds "You eat what your mouth is made for". Humans are capable of eating most anything so perhaps we should start there. What would you be unable to t if you lost your front teeth? What would you be unable to eat if you lost ur back teeth?

Perhaps, the parts of animals' mouths can tell us something about their et. For example, what does a frog eat? How do its mouth parts aid it in taining that food? How long would a frog live if its food supply was no nger available and it had to suck the juices from plants?

Today we will try and predict the eating habits of any animals you collect examining their mouth parts.

MATERIALS:

Plastic bags, hand lens or stereo microscope, assorted animal keys, pencil, and writing surface.

PROCEDURE:

1. Each member of the team collect at least one animal (handle it carefully to keep it alive).
2. Describe the area and what the animal was doing when found.
3. Return to your group and find and carefully observe the animals' mouth parts. Draw them on your data sheet.
4. Compare your drawing with the other students and guess at the food type the animal could eat with those parts; discuss with your other classmates.
5. After you have written and agreed with the members of your group on the food habits of all animals collected, use keys to identify animal and determine food habits.
6. List all your results and compare them with the other groups when you return to class.

DATA SHEET

outh Parts and Food Types or You Eat What your Mouth is Made for.

NIMAL NAME: ______________________________

ound (describe area):

bservation (what was it doing):

raw Mouth Parts:

heory of Food Eaten:

ook's Food Habit:

ARNING EXPERIENCE TITLE:	*REPTILES AND AMPHIBIANS*
DIENCE AND/OR GRADE LEVELS:	a) Special Education b) Intermediate/Primary (Learning Disability, Physically Handicapped, Deaf)
RRICULUM AREA:	Natural Science
ONCEPT:	Theme of Learning Experience: *Reptiles and Amphibians are often misunderstood organisms which play a vital role in the natural balance of a given ecosystem.*

BJECTIVES: Upon completion of this activity, students should be able to:

(1) Differentiate between the different types of reptiles and amphibians in the study area.

(2) Distinguish between warm and cold blooded animals.

(3) Identify the role of at least two of these creatures within the balance of nature.

(4) Discuss basic life habits and adaptations that reptiles and amphibians have made in their evolution.

ONCEPTS:

(1) Within a natural community, we can identify groups of these animals on the basis of sight, color, odour, touch, and habits.

(2) Reptiles and amphibians play a vital role in the ecological balances of the natural community.

EXPLANATION OF ACTIVITY:

This activity deals with a direct sensory approach with collection and observation of easily captured and maintained representative species. A student/teacher ratio of 1:4 is highly recommended to make these activities a success. Higher ratios are only advised at the discretion of the special education teacher.

PROCEDURES:

Snakes (non-poisonous) can easily be caught in the field with the hands or with a three-foot stick having a "Y" or prongs at the end (this arrangement makes it easy to pin the snake to the ground). The right hand should be slipped gradually up over the body to a position behind the neck while the reptile is being held in the middle by the left hand (a snake should never be squeezed). Specimens are then placed in pillowcases and transported to holding tanks. Leather pigskin gloves can be used when picking up the snake for better control and confidence.

- PRECAUTION - Wearing high leather boots in country that is infested with poisonous snakes and watching where hands and feet are placed during hiking or picnicking reduces the element of risk to almost nothing.

AMPHIBIANS - Toads, frogs, salamanders are readily available and little experience is needed in catching specimens. When located, they should be placed in appropriate size jars with ventilation and a moist paper towel to keep their skin moist until reaching terrarium.

- WHERE TO LOOK FOR REPTILES - Snakes - under rocks, rotted logs, or in open fields. Turtles - deep moist woods, ponds, lakes, streams. Lizards - fence posts, on rocks, and open fields.

- WHERE TO LOOK FOR AMPHIBIANS - Toads - upland woods, moist evergreen forest. Frogs - ponds, streams. Salamanders - under moist forest rocks, logs, stream side, as well as pond sides.

FIELD ACTIVITY:

SNAKES - Because many snakes are preyed upon by other animals, they are secretive and hard to find on field trips. Another reason they are hard to find is due to the protective colorations of their skin. Camouflage is very important for protection of snakes from their enemies. Here is a field activity that will involve everyone and demonstrate the concept of protective coloration in snakes.

Utilizing a picture of a snake, the instructor should draw the pattern of design of the snake's skin on a piece of white paper. This pattern should be about 2" X 7". Next, copy this pattern enough times so that every student has their own pattern (Xerox copying is handy). Now, have students color their pattern any way they want, keeping in mind that their pattern colors should blend with nature's colors.

EXAMPLE:

Now, take everyone out in the field and have them place their patterns where they camouflage best. Then go around to each person's pattern and see which colors blended best with the surrounding environment. Compare and discuss your findings.

SOUNDS OF WOODLAND POND - A good field activity is to locate a pond that has a population of frogs. In late afternoon, have your students position themselves around it and remain still. Within a short period the frogs should start their chords of gulps, gurgles, and other vocal sounds. Have the students see how many different sounds they can identify. Why are they calling? Possibly have each child tune into one sound and explain it to the class in terms of what it sounded like and compare it to a man-made sound.

FOLLOW-UP:

STUDY OF THE FROG

MATERIALS:

Small jar, with an inch of water
Live frog

DIRECTIONS:

1. Place the frog in the jar of water where it can be seen from all sides.

2. Observe the following characteristics and adaptations;
   Color: Dark on top, light on bottom - protection.
   Shape: Streamlined - speed.
   Skin: Smooth, slippery - escape from enemies.
   Back legs: Strong muscles - jumping and swimming.
   Webbed feet - swimming.
   Eyes: Project from top of head - can see above water while body is under water.
   Three eye-lids, upper, lower, and a thin membrane that covers eye when under water.
   Ears: Side of head - flat, round membrane.
   Nostrils: Tip of head - covered with small flaps that close nostrils when under water.
   Throat: Rapid motion while breathing - stops motion when under water. Breathes through skin under water.
   Mouth: Wide (extends from ear to ear).

3. Place an insect or a worm in the jar with the frog. Notice how the frog catches the insect.
   The tongue is fastened at the front of the lower jaw instead of the back of the mouth. It is forked and sticky. When catching an insect the tongue flips out very fast, snatches the insect and flips it back into its mouth. You will have to watch closely to see it happen.

4. Place the frog in an aquarium and watch it swim.

5. Place the frog on the floor and measure how far it can jump. How many times its own length can it jump? How many times your own length can you jump?

MARSH TERRARIUM

MATERIALS:

Aquarium or any large jar; piece of window glass for a cover; coarse gravel or sand; rich, moist soil from a bag; block of wood; small plants (moss, ferns, arrow head, liverwort, lichens, ground pine); small animals (frogs, tadpoles (in spring); turtles; land and water snails; salamanders, lizards).

DIRECTIONS:

1. Place the aquarium or jar near a window where it will not receive direct sunlight.
2. Place a block of wood under one end of the aquarium so that it rests on a slant.
3. Place a layer of gravel at the upper end of the slanted aquarium.
4. Cover the gravel with a layer of rich, moist soil.
5. Plant moss, ferns, and other plants in the soil.
6. Pour water into the lower end of the slanted aquarium until it meets the soil in the upper end.
7. Place the animals in the terrarium.
8. Cover the terrarium with a piece of window glass.

FOOD FOR ANIMALS:

Snails: Lettuce leaves, aquatic plants.
Frogs: Insects, insect larvae, earthworms, fruit flies.
Turtles: Overripe fruit, lettuce, carrots, insects, worms.
Salamanders: Flies, earthworms, meal worms, chopped beef.

CAUTION:

Be sure to remove all food which is not eaten by the animals every day.

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LEARNING EXPERIENCE TITLE: *THE ENERGY CHAIN*

AUDIENCE: Severe limitations for vision impaired

CONCEPT: *ENERGY, INTERDEPENDENCE, SCARCITY*

OBJECTIVE: To identify energy-related problems that students might meet close to home and then to discuss possible solutions.

INTRODUCTION: Population growth, production of goods and services, dependency on foreign oil supplies, environmental health and safety, and the effect of these on our life styles -- each of these is a link in the chain of energy use.

TIME: Class period or longer

MATERIALS:

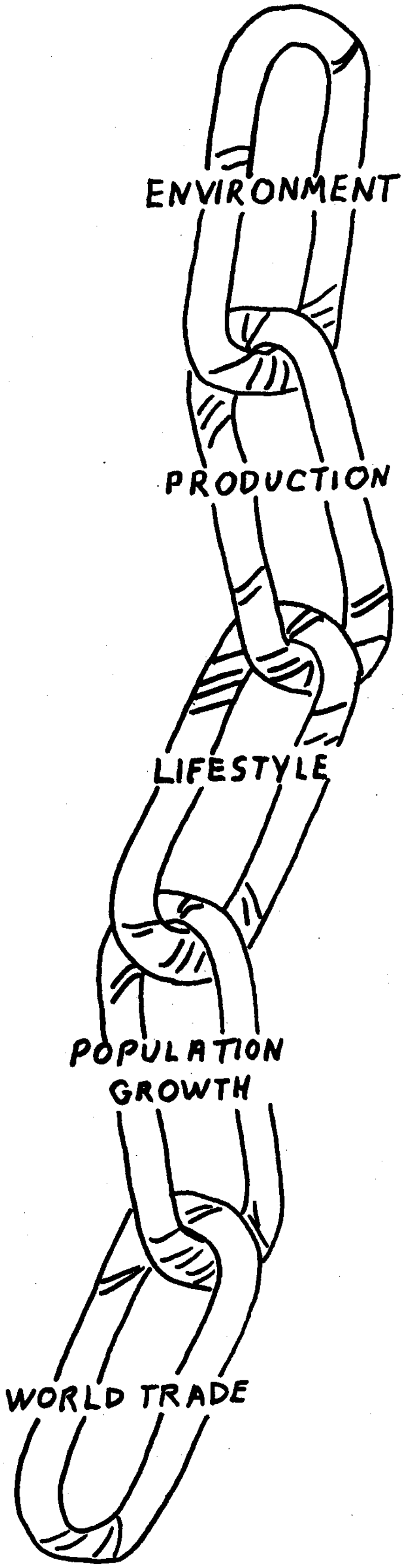
Paper and pencil
Energy chain

PROCEDURES:

1. Show students the Energy Chain and briefly discuss the meaning of each term: Environment, production, lifestyle, population growth, and world trade.

2. Form five small discussion groups and give each group one of the following short stories to discuss:

    a. Time: One possible day in the future. Canada has decided to stop exporting oil. Some of the other oil-producing countries decide to band together and withhold oil in order to raise prices. Canadian supplies of oil are suddenly cut in half. There is no milk or bread in your house, no gas in the car, and you live five miles from the nearest store. What kinds of problems would you and your community face if there were a serious oil-shortage? How could you solve these problems?



b. Each year the number of students in your classroom increases. This means more seats in less space, more noise, less personal help from your teacher. A new business has opened in your town, employing 300 people. Suddenly, your class size has doubled. How will this affect you and your school?

c. A large utility company is planning to build an electric generating plant right where you and your family camp and fish every summer. The coal resources are nearby (mining hasn't started yet though) and the city 500 miles away is desperately short of electric power. Should the plant be built? Why or why not?

d. Your uncle manages a large farm that produces many food products. He operates tractors and giant combines, he runs a gasoline-powered irrigation system, cow-milking machines, and crop-drying equipment. He uses fertilizers made from petroleum. Because petroleum is scarce, his costs have more than doubled. If he cuts back on his use of petroleum-based products, he would seriously reduce food production per acre. Is there any way he can cut back on his reliance on petroleum? How can consumers help cut energy needs for food production?

e. The annual operating budget of your city (your public tax money) can pay for either completion of the super highway system or enlarging the suburb-to-city mass transportation system, but not both. Most commuters don't like to ride buses, so the buses are usually only half full. The vote is coming up at the council meeting next week. How should the council vote?

3. Each group then makes a class presentation by 1) reading the story; 2) indicating to which energy link the story relates; and 3) offering potential solutions to the energy situation.

DISCUSSION: Story 1 -- In such a situation, government might have to institute rationing and allocate available fuel to selected users. Who should have the priority?

Story 2 -- If we move from a classroom population problem to world population questions, what will be the result of the increasing industrialization around the world?

Story 3 -- Can a compromise be reached between need for energy in urban areas and preservation of the natural ecology?

Story 4 -- The food production industry uses more that 12 per cent of the nation's fuel budget. Should Ontarians be eating California avocados?

Story 5 -- Transportation energy use could be cut in half if commuters used buses rather than cars. How can people's attitudes be changed regarding the use of the private auto?

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STEP BEYOND: Let students survey their home and list at least 15 appliances used. After the list is complete, place a P beside those items which are petroleum based, a PL beside all those which plug into the wall, a GR beside those items your grandparents would not have been able to use when they were your age. Together in class determine which items are conveniences, luxuries, or necessities. Suggest alternative ways to reduce energy use in the home.

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The Energy Challenge EEC #1012

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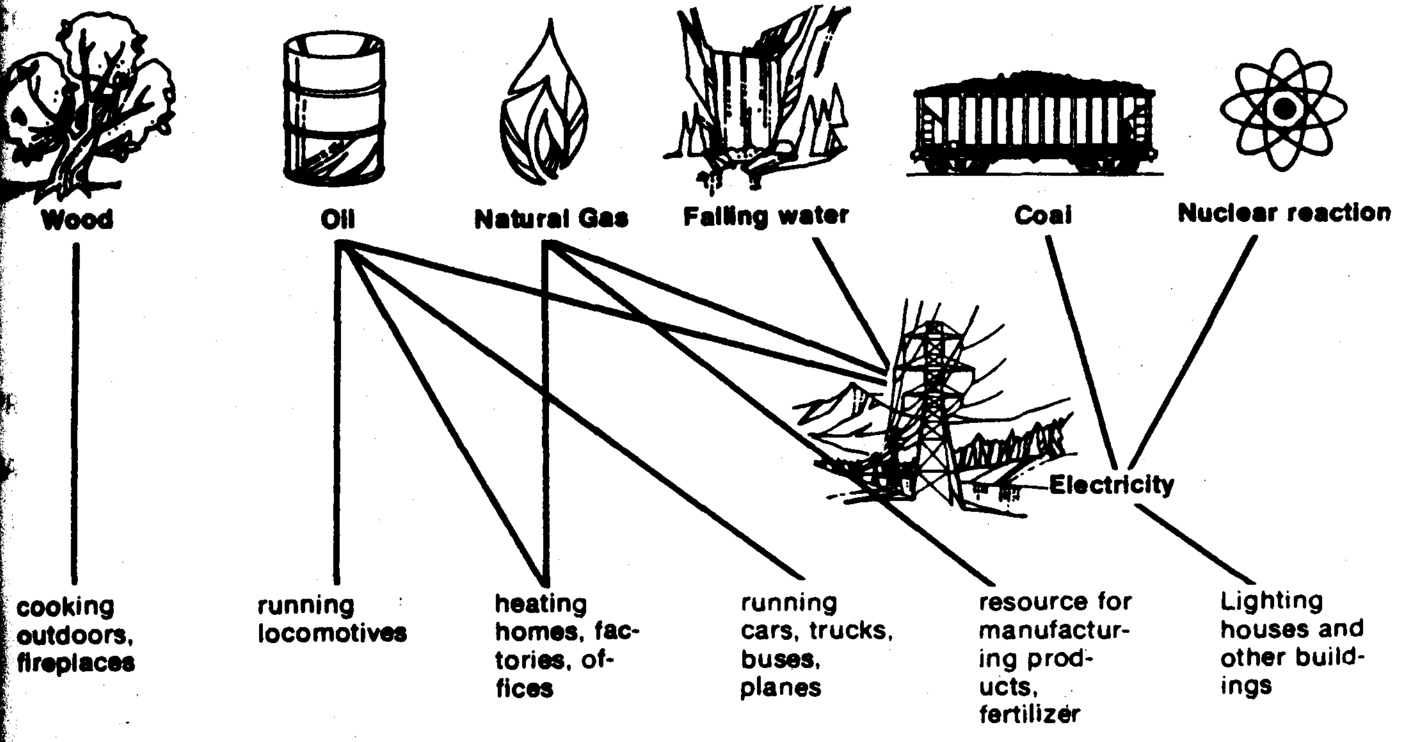
rimary Energy Sources

from The Energy Challenge


Wood
Oil
Natural Gas
Falling water
Coal
Nuclear reaction
Electricity
cooking outdoors, fireplaces
running locomotives
heating homes, factories, offices
running cars, trucks, buses, planes
resource for manufacturing products, fertilizer
Lighting houses and other buildings

LEARNING EXPERIENCE TITLE: *COMPARISON OF SOIL TYPES*

AUDIENCE AND/OR GRADE LEVELS: Intermediate

CONCEPT: Theme of Learning Experience: *Soil is a very important life supporting system.*

OBJECTIVES: Students should be able to:

(1) List three components of soil.

(2) Describe orally differences in texture, color, and water; absorptive quality of a variety of soils (at least two varieties after the trip, more, if follow-up activities are used).

(3) Participate in class studies of soil, by bringing in soil samples and/or performing the experiments.

(4) Make soil and grow seeds in it.

ONCEPTS:

(1) Soil supports a variety of life.

(2) Soil is composed of rock particles, plant particles, and animal remains.

(3) Soils can be recognized as sandy, loam, and clay.

(4) Soils can be identified by many recognizable properties -- texture, color, odour, etc.

ROCEDURE:

ATERIALS NEEDED:

Square of white cardboard
Water
Hand lens
Spade
pH paper
Petri dishes

IELD ACTIVITY:

What color do you think soil is? See what colors of soil you can find on is path. Allow at least 15 minutes for investigations. What seems to be ving the soil these colors? Of what is soil made? Did you see anything that kes you think this? (NOTE: If children do not suggest that rock crumbles to soil, ask such questions as: Did you find anything else on the path the me color as the soil? What happens to the stones when you rub them together?) at causes the rock to break down into soil? Can you find any rocks which show gns of weathering? Can you make soil from any of the stones on this path?

(Allow about 15 minutes for experimentation -- safety glasses should be worn if rocks are to be broken.) How does your soil look compared with what is already here? How does it feel? Squeeze a handful of your soil and a handful of soil that was already here and seems similar to it: Compare the texture, the way th squeezed handful holds together. How would you describe any differences? Look at your hands. What color are they? Smell the soil you have made. Does it have any odour? Is there anything in the soil besides pulverized rock? Investigations should not involve tearing up plant roots. Look for areas where the soil is already partially exposed.

Take a handful of soil from near the roots of the grass. Squeeze it, holding your hand near your ear as you do so. Do you hear anything? Describe what you hear. Compare the squeezed sample with yours. Compare the texture of this soil with the soil you made. Smell this soil. How would you describe any odour you notice? Look at the color of your hand. What do you notice? Examine the soil carefully, using a magnifying glass. Do you see anything in it that was not in yours? What? Look around to see if you can get any idea what this is. Does what you see help explain what you heard and smelled? How? Spread out several handfuls of this soil and describe all the differences you have noticed in the preceding investigations.

NOTE: If the weather has been dry for a long period of time, it may be necessar to pour a little water on the soils being examined. Even if the soil is moderately moist, if time permits, further observations can be made by pouring water on soil and observing what happens. Was the water absorbed? How quickly? If not, where did it go? What went with it? What color changes took place? What happens now if you squeeze a handful? If you were going to make the very best possible soil you could make, what would you put in it? Of what value are the rock particles in soil? Of what value are the plant particles? Of what value are the animals? Value to whom?

FOLLOW-UP:

1. Collect soils from different places (school yard, home yard, woodlot, fields).

   (a) Sieve a sample of each. What is left in the sieve? Did more soil go through the sieve or stay in it? Why?

   (b) Take an equal quantity of each soil sample. Heat each in an oven until dry (or in a pan over a hot plate). Weigh each sample. Record dry weight. Put each dried sample in a glass bottle or test tube. Add an equal quantity of water to each. Observe how quickly the water disappears into the soil. Pour in more water measuring the quantity until each tube is filled to the brim. Did each take the same amount? Let stand five minutes. Pour off excess water from each. Measure the quantity and note clarity. Which soil absorbed the most water? The least? Weigh each sample and record wet weight. Compare with dry weight. Let stand five days. Weigh again. Compare the weights. What do you think accounts for the differences in weight loss? From what soil type did water evaporate most rapidly? Slowly?

(c) Put a sample of each soil type in a test tube or bottle of water. Test for soil acidity or alkalinity using pH paper. What does this mean? What type of plants grow in each? How can acidity or alkalinity be changed (limestone-oak leaves)? Describe what you see happening. Cork the bottles and shake each. Let the bottles stand, and watch the soil settle. Observe at 15 minute intervals. How long is it before the water in each tube is completely clear. Which soil type settled most quickly? Which took the longest to settle? Why do you think this is so?

(d) Combine several different soil types. Add water to just more than cover. Shake. Observe the settling action. After 24 hours observe sediment layers.

2. Make the very best soil you can from natural materials. Play fair! Write your recipe. Try growing seeds in your soil. Have a class contest. Whose soil do seeds find best? Grow some of the same type seeds in the other soil samples. Compare growth.

3. Find examples of decomposition in the school yard and at home. Does decomposition continue if the object is brought into the classroom? What factors hasten decomposition?

4. What is a compost pile? Perhaps some students could start one with parents' help. What reasons could you give for having one?

5. What decomposers are in the soil you can't see? Sprinkle particles of decaying wood or pulverized soil in the surface of agar in several sterile agar plates. Keep the plates in a warm (72^{o}F), dark place for several days. What do you see on the plates? Which plate showed the most growths? (Check with a high school biology teacher for directions on preparing the agar.)

(5) Objects in our surroundings relate to one another; our perception of all the objects together is the basis for our response to our surroundings.

MATERIALS:

Clipboard
Cardboard picture frames
Pencils
Paper for writing and sketching
Crayons

PROCEDURE:

Have each student find a single object somewhere near them. Ask each student to write down on paper at least four (4) words which describe the object. Gather the students together and with each student in turn say: without telling us what the object is that you described, how or what did you feel about the object? Were you happy? Sad? Afraid? Excited? Have the student read the words he or she has written on the paper to the other students. Ask the other students to attempt to guess what is being described. When the object is mentioned, what other words would you use to describe the object to somebody. How did each of you feel about the object when you found out what it was?

Ask each student to find two other objects that are nearby or beside one another. Sketch the object on your paper so that they look as real as you can make them. When they have finished, have the students exchange their sketches with one another. Taking each individually, ask the student to look carefully at the picture and identify what the objects are. As the objects are identified -- do you think it is light or dark in color, heavy, or light in weight, larger or smaller than yourself? What basic shapes can you see in the drawing? Circles, squares, rectangles? Do you think it would have a smell? How would it smell? Are they sharp or dull? Friendly or dangerous?

Find out who the owner is. Ask: why did you choose those two objects? Do you like the objects? Are you afraid of the objects (get the student to use emotional words in describing the subject such as strong, beautiful, ugly, old, nice, strange, peaceful, exciting, etc.) Why do you feel that way about the objects? Do the rest of you feel the same way? If not, why not? (Get students to relate personal experiences with objects.)

Give each of the students a square picture frame. Ask them to hold the frame in front of their face and look closely at something small (example: a bug on the ground, a pebble, a small weed). Keep watching the small object and move back until you can see another (new) object in the picture frame. Do this several more times until you have five (5) or more objects in your picture. Sketch your picture on the paper using straight and curved lines, circles, and other familiar shapes. Show the objects size relationship to one another. If something is dark, use shading to show how the objects contrast in color qualities. As you draw your picture try to show how you feel about the objects you see.

When the students have finished their sketches: write a few sentences about what you have drawn or make up a little story to go with your picture. As you do this try to use words that show how you feel about the objects and the picture you sketched.

When the writing has been complete: ask the students to individually describe their sketch and what objects are present. Ask the other students to close their eyes and try to imagine the picture that is being described. Allow the other students to question the student describing the picture for details. Ask each student to then draw the picture he or she has imagined. Have them compare their sketches to the original. Discuss any significant differences that occur as they each compare. (What kinds of feelings were experienced by the listeners as the picture was being described? Encourage the use of emotion-connoting words.)

Following the discussion ask the student to read the sentences or story that he or she has written. Look for emotional indications in the written material. Question the writer about these emotions and relate them to those experiences by the listeners or have other students determine the emotional experiences of the writer (do you think he or she was afraid of the objects, liked or disliked the objects and why)?

If time allows repeat the above using larger areas as subjects.

FOLLOW-UP:

1. Have students examine selected objects and write stories about the objects. For example, how they came to be, how they came to be located where they are, what effects the object may have on others. Have the students orally read their writings and compare what they have written with what others have written.

2. Using a procedure similar to that in #1, poll the students emotional responses to the objects. Are most afraid? Did most enjoy seeing the object or dislike it? Discuss the various responses and investigate the reasons for the common responses.

3. Sketching skills could be developed by practice in recognizing detail and object relationships in prepared sketches.

4. Have students list all the words that could be used to describe an object, or a complete picture.

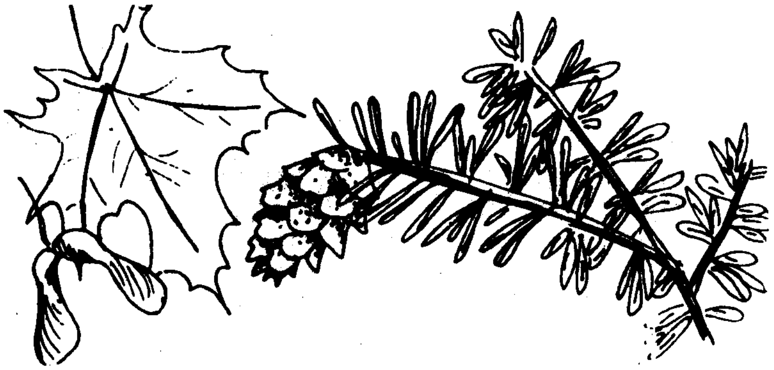
5. Collect and examine composite pictures prepared professionally. Poll the students for emotional response and recognition of detail in organization.

ADDITIONAL FOLLOW-UP:

6. Divide students into pairs. Have them sit back to back. As one student describes an object the other student will draw the object which is being described. When finished, the drawer must find the object. Then, reverse the roles. It is possible to have two students on each team, with two students describing the same object and the other two drawing it.

7. These and all other nature writings should be saved over the year for a final booklet or Nature Book to be compiled by each student as a culminating project for the year. See an explanation of how to compile a Nature Book.

8. Select some leaves of the same tree or shrub. Have students write some descriptive words about it or write a creative story about them. Upon completion, place the leaves on a hard surface. Place the sheet of paper with the students writing facing up. With a crayon and pressing firmly, color the leaves. The writing must be done first, since you cannot write on top of the crayons.



LEARNING EXPERIENCE TITLE: *EXPERIENCE IN EXPRESSING TEXTURES*

AUDIENCE AND/OR GRADE LEVELS: Intermediate
Various Special Education Audiences

CONCEPT: Theme of Learning Experience:
Nature provides aesthetic value for people to enjoy.

OBJECTIVES:

(1) To develop an awareness of texture in nature using the sense of feeling.

(2) To acquire a knowledge of expressing textures on paper through art.

(3) To understand the correlation (symbolism) between shapes and colors with textures.

(4) To re-enforce the concept of the primary and secondary colors.

(5) To develop an appreciation for the aesthetic value in nature.

CONCEPTS:

(1) Textures are surface designs.

(2) Textures illustrate variations in depth within the design.

(3) Sharp to smooth curving lines are found in textures.

(4) Patterns in textures are created by the depth and the lines.

MATERIALS:

Large black crayon without paper (each)
Small pieces of tissue paper -- various sizes and colors
Clipboard
White drawing paper -- 9 x 12 (each)
White glue
Small glue pan or dish (several)
Small paint brushes (two dozen)

PROCEDURE:

Introduction:

1. Talk briefly on the five (5) senses.

2. Emphasize the sense of "feeling", asking the students how can we express this feeling to others.

3. Ask the questions:

    (a) How is "feeling" expressed in nature (texture)?

    (b) How can we translate these textures elsewhere?

    (c) What relationship do the following words have with texture?

        (1) rough-smooth
        (2) jagged-curved
        (3) red-blue (also other colors)
        (4) large-small

4. Demonstrate:

    (a) Texture rubbing on tissue paper.

    (b) Tearing the tissue paper to express textures.

    (c) Overlapping the tissue paper to create additional colors, thus expressing other "feeling".

NOTE: The sense of touch is not the only "feeling" in nature. A student might have an emotional feeling about a texture, which can also be expressed through shape and color.

FIELD ACTIVITY:

1. Have students make as many texture rubbings as they wish keeping in mind the following relationships:

    (a) Texture to size of paper.

    (b) Texture to color.

    (c) Feeling to size of paper.

2. After texture rubbings are finished, arrange rubbings on a piece of white drawing paper. Keep in mind the following:

    (a) Size relationship.

    (b) Color.

(c) Overlapping to create new colors.

(d) The feeling (emotional) created by the texture.

There should be an informal balance of these relationships.

3. After a pleasing arrangement is made, remove all tissue paper from the sheet of white paper, remembering where each piece is to be placed. Starting with the piece of tissue paper that was on the very bottom of the overlappings, spread a glue mixture (one part white glue with one part water) on the back of the tissue paper with a brush. Put this piece of tissue paper back on the white paper where you had originally placed it. Continue until you have completed your arrangement again.

OLLOW-UP:

1. A texture collage made with actual texture pieces.
2. A three-dimensional collage with emphasis on form as well as texture.
3. See Learning Experience: Experience in Sketching.

ARNING EXPERIENCE: *EXPERIENCE IN SKETCHING*

ADE LEVEL: Intermediate
Severe limitations for vision impaired

NCEPTUAL THEME: *Patterns and designs exist in nature.*

BJECT: Nature: particularly plant life with emphasis on detail of one subject and not an entire scene.

JECTIVES:

(1) To develop an awareness of the patterns and designs that are found in nature.

(2) To understand how some modern art is a form of reality. Some paintings are magnified showing great detail rather than a distortion of a shape with no real meaning or purpose.

ATERIALS FOR INTRODUCTION:

1. Collect pictures of nature such as: (a) trees; (b) flowers; (c) grass; (d) different tree bark, etc.
   Several close-up views showing great detail is necessary. A good source is the Audubon magazine January 1969 and 1970.
2. One 9" x 12" sheet of oak tag. Cut a window 3" x 5" from centre.
3. If appropriate slides are available, these could show detail in patterns in nature.

NTRODUCTION:

1. Show pictures of forests, fields, flowers as an entire picture.
2. Use the oak tag sheet and place over these pictures to only show a section of the picture.
3. Bring to students' attention the lines, patterns, or designs that are created by this method.
4. Point out this is what they should be looking for when sketching, parts of a whole rather than the entire scene or object.

ATERIALS NEEDED FOR FIELD TRIP (each student):

2B sketching pencil (or any soft pencil)
Gum eraser
Cardboard (9 x 12 or slightly larger) -- to use as writing board
Large "bull clip" to attach paper to cardboard
Several (6) sheets newsprint

PROCEDURE:

Each student selects a spot or subject to sketch and proceeds to make "thumb-nail" sketches in the following manner:

1. quick lines
2. free moving (not forced)
3. employ shading where necessary
4. emphasize details, not completed picture

As many should be made as time will allow.

FOLLOW-UP PROJECTS:

Using thumb-nail sketches as subject, finish in the following manner:

1. pen and ink sketch
2. scratch board
3. colored pencil finished sketch
4. watercolor using:
    (a) wash for background with pen and ink sketch overlay
    (b) dry brush
5. copper relief
6. wax paper -- watercolor resist

Colors used may suggest plant or feeling.

EARNING EXPERIENCE TITLE: *COMMUNICATIONS: NATURE BOOKS*

UDIENCE AND/OR GRADE LEVELS: Primary/Intermediate
Severe limitations for vision impaired

ONCEPT: Theme of Learning Experience:
Creative writing, texture arts, scientific investigations can all be correlated in this year-long activity.

BJECTIVES: Students will:

(1) Select creative writings, texture art activities, scientific investigations and photographs done over the entire year, to become part of their nature book.

(2) Learn the basic parts of a book. i.e.

Title Page
Dedication Page
Table of Contents
How to lay out a book

(3) Learn how a book is put together.

ONCEPTS:

(1) Critical evaluation of their work.

(2) Correlating the year-long study of environmental education with every subject area.

ATERIALS:

For each nature book

Two pieces of cardboard 6" x 9"
Colored burlap 24" x 24"
Glue
Mystic Tape (any color)
  36" (1½" wide)
Plant or seaweed pressings
Selected student writings
Leaf or bark rubbings
Pictures
Learning experience write-ups

ROCEDURES:

1. From ditto paper cartons cut up pieces of cardboard, 6" x 9". For each book you need two.

2. Spread glue over one side of cardboard and press it firmly into the middle of a 12" x 12" piece of burlap. Cut burlap from the corners until you are about ½" from the corner of the cardboard. Spread glue over the back of the cardboard and press burlap onto it. Cover with books until dry.

3. Take ten or more ditto sheets and fold them. Staple the middle of this packet. These are the pages of the Nature Book. If there is a class project on Indians or geologic formations which you could type out ahead of time, these can be folded in at this time to become the centrefold.

4. Each student must make a title page. Have several picture books available for them to see the format. The author of each Nature Book will be the student. The publishing company will be the students surname. The next page will be the dedication page. The students may dedicate their book to anyone or anything. Both these pages can have illustrations.

5. In preparing the pages for writing, use a felt tipped pen, (different colors) and make a 1" margin all around. Then make ½" lines for the actual writing. If this is too difficult, the margin and lines could be drawn on a stencil and each page run off on a stencil machine (both sides) ahead of time.

6. Students should then select their best work of the year. i.e. poems, creative writing, scientific research, bark rubbings, leaf pressings, algae pressings, etc. After proofreading by their fellow classmates and the teacher, these can be written into the nature book.

7. When all the writing is completed and illustrations have been added, the book can be put together. Place the pages inside the cover. Cut a strip of mystic tape 18" long. Lay it on the table with the sticky side up. Press the binding of the book onto the centre of the tape. Gently, remove the pages and open the cover flat on the desk. Fold the mystic tape onto the cover. Replace the pages. Attach the pages to the covers by cutting a 9" piece of mystic tape for each side. Attach pages to cover.

8. To cover the inside of the front and back covers, you can glue a photograph or an algae pressing or leaf pressing.

ADDITIONAL COMMENTS:

1. Each year, I ask the previous year's students to loan me their Nature Books to give my new class some ideas.

2. If seeds are collected in the Fall of the year, these could be used to write the words, Nature Book on the covers. Also, thin crosscuts of logs can be glued to the covers.

3. Leaves which have been pressed and dried, can be coated with wax on one side and glued to the pages, allowing the students to feel the outline and the veins of the various leaf types.

4. Display the completed Nature Books.

LEARNING EXPERIENCE TITLE: *SPRING WILDFLOWERS: FLOWER FUNCTION*

AUDIENCE AND/OR GRADE LEVELS: Intermediate
Severe limitations for vision impaired

CONCEPT: Theme in Learning Experience:
Flowers play an important part in the life cycle of a plant.

OBJECTIVES: After a field trip students should be able to:

(1) Identify and differentiate between the buds of leaves and of flowers.

(2) Name and describe two methods of pollination of flowers.

(3) Identify the major parts of a flower that function in reproduction.

(4) Observe the cell structure of several species of flowers.

CONCEPTS:

(1) Flower buds and leaf buds are different.

(2) Flowers are adapted to attract insects which aid in pollination.

(3) Pollination is necessary for seed development.

(4) The parts necessary for seed production are the pollen-producing stamens (male) and pistils (female).

(5) Plants bloom at different times.

MATERIALS:

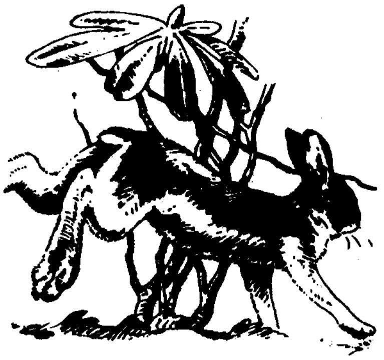
Hand lens
Identification keys
Stereo-microscope
Sharp knife
Crayons

FIELD ACTIVITY:

Observation by sight and touch and smell. Description, drawing, photograph, pressing.

Smell the air of the woods and field. Describe the odours. Note, from a distance, the colors and abundance of leaves. Look at the branches of trees and the stems of other plants. Locate the leaves. Locate the buds, if any. Locate flowers on trees and other plants.

Smell the leaves and flowers of the same tree (or other plant). Do they have the same odour? Which do you think has the more pleasant odour: leaves or flowers? Do you think everyone would agree with you?



Look for plants that have buds but no flowers. Look for plants that have buds partially opened; fully opened. Open a flower and a bud. Locate the ovules within the ovary. What will these look like in the fall?

Look for a leaf bud and a flower bud on a tree. Try to find the tiny leaves in a leaf bud. Describe them. Describe the differences between the two.

In the field, look for insects close to or in flowers. What insects do you see? Are they flying or crawling? Do they go to flowers of the same variety? Or of different varieties? Smell the flowers. Are the odours pleasing to you? Do you think it is the odour or some other factor that attracts the insects?

What part do these insects play in the story of seeds and their dispersal? Can you suggest other possibilities for pollination of flowers?

Can you predict the fall appearance of the plants you have observed.

LOWER DATA SHEET

ame of flower ______________________ Latin name ______________________

ame of book found in _________________________ Page number ______________

Pertinent Information:

Color __________

Smell __________

Size __________

No. Petals__________

Shape __________

Location __________

Density __________

Freehand drawing of
entire flower

Microscope drawing of
cells in petal

Microscope drawing of
cells in leaf

Leaf rubbing

Stem rubbing

FLOWER DATA SHEET

Name ____________________ Name ____________________

Microscope
drawing
of cells
in petals

Color ____________________ Color ____________________

Smell ____________________ Smell ____________________

Size ____________________ Size ____________________

No. Petals ____________________ No. Petals ____________________

Shape ____________________ Shape ____________________

Density ____________________ Density ____________________

Name ____________________ Name ____________________

Microscope
drawing
of cells
in petals

Color ____________________ Color ____________________

Smell ____________________ Smell ____________________

Size ____________________ Size ____________________

No. Petals ____________________ No. Petals ____________________

Shape ____________________ Shape ____________________

Density ____________________ Density ____________________

LEARNING EXPERIENCE TITLE: *PLANT IDENTIFICATION*

AUDIENCE AND/OR GRADE LEVELS: Intermediate
Minor limitations for vision impaired

CONCEPT: Theme of Learning Experience:
Plants are divided into two major categories: flowering and non-flowering.

OBJECTIVES: After trip students should be able to:

(1) List the six groups of plants found on the trip.

(2) Describe two characteristics of each group.

(3) Describe or draw two representatives of each group.

(4) Evidence new knowledge and interest in non-flowering plants.

CONCEPTS:

(1) Non-flowering plants include ferns, mosses, fungi, algae, and lichens.

(2) Non-flowering plants do not produce seeds.

(3) Non-flowering plants grow in many areas, under many conditions.

MATERIALS:

Field guides for trees, ferns, and non-flowering plants
  (a tree guide, fern guide, and non-flowering guide
  for each participant)
Trowels
Crayons
Paper
Ten gallon tank
Bucket

FIELD ACTIVITY:

Can you find examples of the different kinds of plant groups: flowering plants, ferns, mosses, fungi, lichens, algae? Can you find plants that you cannot place in one of these groups? Can you find clues and references that will give you some idea what the unknown plants are? Which group is most numerous in the woods? Which group is most numerous in the field? Can you explain why some might be more numerous in one place than in another? How many different flowering plants can you find? How do you know they are all flowering plants?

FERNS:

How can you tell one fern from another? Compare the fronds. Are they all the same shade of green? Can you find fronds that seem to be made up of smaller fronds? Look at the backs of the fronds. Feel them. Do you notice anything that is not on the upper surface? Do all fronds have these dots? Do all ferns have them? Are they always in the same place on the fronds? Can you find a fern that has a leaflet that looks like a little stocking? What might be a good name for it? Can you suggest names for any other ferns based on your observations? Do ferns have seeds? Why not? How do they reproduce?

MOSSES:

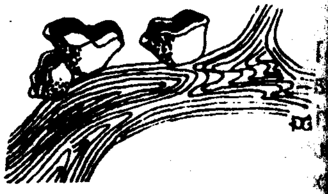
How can you tell one moss from another? How can you recognize moss? Is there more than one kind of moss? How many kinds of moss can you find? Describe the differences. Can you suggest some names for some of the kinds of moss you find? Are the same kinds of moss growing in the field as in the woods? How does moss feel (compare with feel of lichens, algae)? How does the ground feel where moss is growing (compare with feel of lichens, algae)? How tall does moss grow? Measure the height of the tallest moss you can find. Find the shortest. How does moss differ from ferns? From flowering plants? What are the little stalks you may find growing from moss? What do they do?

ALGAE:

Is that algae or moss on the trunks of the trees? How do you know? Is it true that it grows only on the north side of trees (which direction is north)? Why do you suppose people say you can tell which way is north by the "moss on the trees" if it isn't true? Why might more algae be found on the north side of trees than on the other sides? How does algae differ from moss? How does algae feel? Try to describe the feel. Compare with lichens, mosses.

LICHENS:

How do you recognize a lichen? How do lichens feel? Compare them with mosses, algae. Try to describe the feel. What color or colors would you use to describe lichens? How many different lichens can you find? Can you suggest names for some of them? Especially one with a red top, one that looks like this?



Where do you usually find lichens? What are they doing to it? How does the ground feel where the lichens are growing? Compare with the feel of the ground where you find mosses, ferns. Which plants do you think would be first affected by a lack of water? Algae, mosses, or lichens? Why? What two kinds of plants live together to make a lichen? What kind of relationship is this?

FUNGI:

> *How many kinds of fungi can you find? Feel them. How would you describe how they feel? Can you find fungi that have stripes? That are pink? Orange? Brown? Reddish? Green? What does the green color of a plant usually mean? Do fungi contain chlorophyll? What might be the green coloring on some of the fungi? Why might algae be growing on fungi? Where are the fungi growing? What reasons can you think of for it growing where it does?*
>
> *Feel the wood under the fungi. Try to describe how it feels, how it looks, how it sounds when you tap on it. Why does it have these characteristics? Both fungi and algae were found growing on trees. Are both dependent plants? If not, why is the algae growing on the trees? Could algae grow on rocks?*

Participants will do fern rubbings and distinguish various leaflets and textures.

Also, participants will construct a terrarium made from mosses and lichens.

LEARNING EXPERIENCE TITLE: *ANIMALS OF THE WOODS AND FIELD*

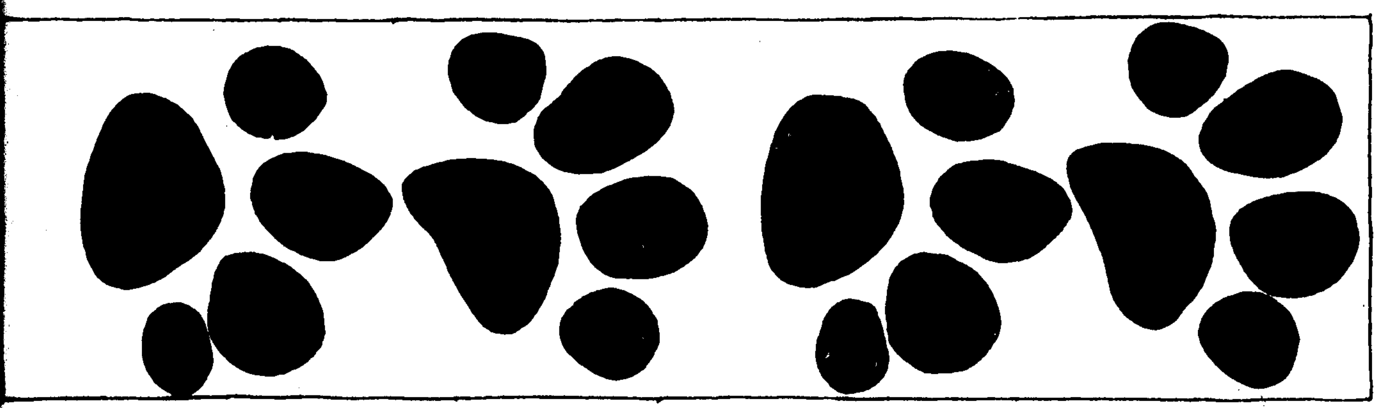
AUDIENCE AND/OR GRADE LEVELS: Special Education Teachers/Youngsters
Primary/Intermediate
Severe limitations for the vision impaired

CURRICULUM DISCIPLINE AREAS: Natural Sciences

CONCEPT: Theme of Learning Experinece:
a) *Communities of living organisms are dependent upon their environment.*
b) *Every animal track is a record of a particular creature's activity at a particular time.*

OBJECTIVES: After completing this activity, participants should be able to:

(1) Identify the traces of many of the animals that inhabit wooded areas.



(2) Support all inferences made in regard to animal traces with logical reasoning based on observations.

(3) Make a plaster casting of animal tracts found in a woodland area.

CONCEPTS:

(1) Animal's presence is evident from sounds, partially consumed food, homes, droppings, tracks.

(2) Different animal (traces) are evident during various seasons and indicate many things about the animal that made it.

MATERIALS:

Paper
Pencil
Magnifying glasses
Keys for identification
Track cards
Paint and paintbrushes
Plaster of paris
Cardboard
Cups for mixing
Whirlpack bags

EXPLANATION OF ACTIVITY FOR TEACHER:

This workshop will take place out-of-doors prior to a brief introduction upon meeting. The introduction will also include distribution of materials needed to make plaster castings of various animal tracks.

PROCEDURE:

STEP ONE: *After finding a track, carefully brush away twigs, small stones, and excess dirt found in its immediate vicinity.*

STEP TWO: *Use cardboard strip 1½ inches wide to surround track. Fasten strip with paper clip to form a dam. Push down lightly into dirt.*

STEP THREE: *Mix plaster of paris to consistency of thick cream (put plaster into water not water into plaster!) Pour slowly over track.*

STEP FOUR: *After plaster hardens, about 30 minutes, lift out, peel cardboard away. Wash dirt away after 24 hours. Painting gives it a finishing touch.*

FIELD ACTIVITY:

General observations and recordings upon arriving at the area. What season is this (early, late)? What is the time of day? How does the air feel (temperature)? What is the condition of the sky? What is the condition of the wind? Looking at the woods in the distance, what is the color? Do the trees move? Do the trees appear to be conifers? Deciduous? A mixture? Support your answer with reasons.

Listen in silence. What kinds of sounds do you hear? Are the sounds natural or man-made? How can you tell the difference between a natural and a man-made sound? Is there repetition in the sounds you hear? Describe the most outstanding sound you hear.

The next portion of the trip will be accomplished if the class group can be divided into smaller groups of about 8-12 each.

ANIMAL TRACES:

Listen, observe, and record. What do you hear? Describe what you hear. How can you identify bird sounds? How many different kinds of bird sounds do you hear. Where are the bird sounds coming from? Do they all come from the same places?

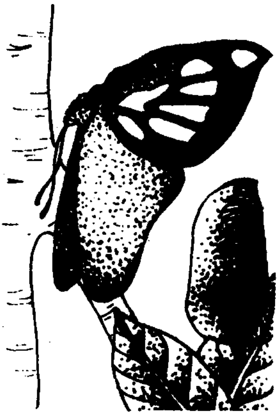
TREES:

Look at the trees as you walk. Select a tree that appears scarred. Describe the scarring. Is it regular. Irregular? Is the scar fresh? Is it old? How do you know? Is the tree living? How do you know? Look for insects on the trees.

Look for bird traces in trees. Describe them. Look for bird traces on the ground. What do you think produced these traces?

What will you record about these traces to help you identify them, if you don't know what they are?

UNDER A ROCK:



Lift a rock -- pull it back and look over the far edge. Describe the earth under the rock. What is its color? What is its texture? Describe any living organisms you see under the rock. Type, size, movement, color, or lock of color. Replace the rock in the same spot. Why?

OTHER ANIMAL TRACES:

Listen for sudden sounds at ground level. Look for signs of partially eaten plants, fungi, nuts, etc. Look at leaves on growing plants. Do you see any indications that insects have been eating leaves? What would happen to a plant if the insects ate all of the leaves? What would happen if the leaves were no longer available to the insects? When does man try to control this? Is this a good idea or bad? Why? Can you find a food cache? Has part of it been eaten? What animal could have collected the supply? Why?

Look for animal tracks. Where are they going? Where did they come from? Who made them?

Look for animal homes. What are they made of? Where did the material come from? Did you find any homes the animals live in, but did not build? What objects do you see in the shelters? Did the animals bring them there? How are the homes different? What homes do you see high above your head? What animals can be found on or near the ground? What do you notice about the size, color, position of the animal shelters that help to hide them?

BONES, FUR, & FEATHERS:

Look at and feel these remains if you find them. (Do not disturb!) Examine the surrounding area for additional traces. What remaining parts will help you to identify this animal? Is this the remains of a bird, mammal, reptile, fish? How do you know this?

Participants will search designated area for various types of tracks. The tracks found can offer many clues to the animal's identity, the direction in which it was going, and it's size. They may show how the animal gets its food, what it eats, where it lives, how far it travels, what its enemies are, and what kind of environment it requires for protection. Each animal, as it moves, leaves a characteristic set or pattern of prints. The size, depth, and arrangement of these prints are directly related to the rate at which the animal was moving. After drawing conclusions about the animal traces, participants will make a plaster casting of an animal track.

FOLLOW-UP:

Take plaster casting back to class and do the following:

(1) Paint

(2) Identify

(3) Do a track picture story

(4) Research animal's dependence upon his environment

(5) Wall decorations from animal track casts

LEARNING EXPERIENCE TITLE:	*NATURE HUNT*
AUDIENCE AND/OR GRADE LEVELS:	Open to discretion of teacher Minor limitations to vision impaired
CONCEPT:	Theme of Learning Experience: *There are similarities and differences in the natural world.*

OBJECTIVES: After this activity students should be able to:

(1) Compare two articles noting their similarities and differences.

(2) Share ideas through discussion, conversation, art work, stories, etc.

CONCEPT:

(1) Items are distinguished and identified by noting their similarities and differences.

MATERIALS:

Two man-made items exactly alike
  (pencils, pens, buttons)
Natural items whose absence will not
  damage the area (dead leaves, weeds,
  seeds, seed pods, rocks, nuts,
  rotting wood)
List of feel words (fuzzy, crispy,
  prickly, bumpy, rough, smooth,
  squeezy, fluffy)

FIELD ACTIVITY:

Using two man-made items that are exactly alike, point out and discuss their exact likeness. Select two items such as leaves, rocks, or blades of grass. Discuss their similarities. Explain that they are similar because they are the same type of item, from the same plant, or of the same color and texture. Can you find two items that are similar? Can you find two items that are alike? Why or why not?

Give the group the natural items you have collected one at a time. Tell them to look for a matching item and, when they have found one, return to the leader. (Make sure they do not wander too far in their search.) Compare the items the children bring back. Discuss the similarities they see that helped them to make the match. Go on to the next item, repeating the process till all the items have been used. Go on to the feel words, using the same method as with the items. Can some of the items collected be classified under more than one word?

LEARNING EXPERIENCE TITLE:	*ORIENTEERING: SIMPLIFIED MAPPING SKILLS*
AUDIENCE AND/OR GRADE LEVELS:	a) Special Education Teachers b) Learning Disabled Youngsters Severe limitations for vision impaired and deaf
CURRICULUM DISCIPLINE AREAS:	Natural Sciences: Math
CONCEPT:	Theme of Learning Experience: *Maps are important for travel, property division, and early development of all nations.*

OBJECTIVES: After completion of this activity participants should be able to:

(1) Use a compass to find direction.

(2) Estimate pace and distance.

(3) Recognize basic map symbols.

(4) Construct a map, using compass, pacing, and scale.

CONCEPTS:

(1) A compass is used to determine direction.

(2) A map is a picture of an area, using symbols to represent places and things.

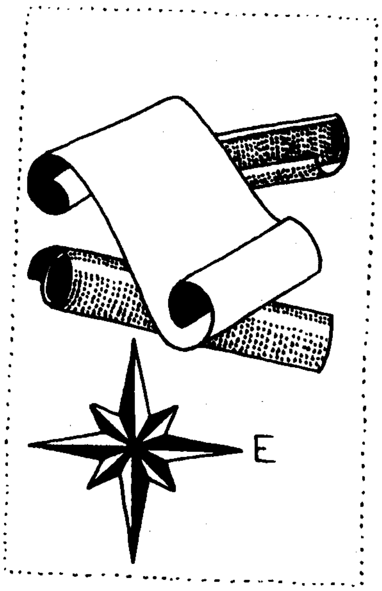
MATERIALS:

Compasses for each participant
100' rope
Pencils
Clipboards
Graph paper

EXPLANATION OF ACTIVITY FOR TEACHERS:
PROCEDURE:
FIELD ACTIVITY:

Directions are usually indicated as North, East, South, and West, and their subdivisions NE, SE, SW, and NW. Normally, a circle is divided into 360°. For greater accuracy, degrees are often used instead of N, S, E, W. For instance: 0 degrees is North, 90° is East, 180° is South, and 270° is West. North may also be designated by 360°.

Orient your compass by turning it until the North end of the needle points to the N on your compass. Allow the participants time to do this. Have them all do this.



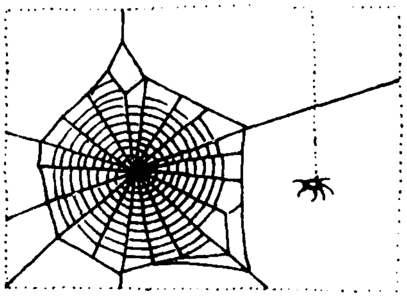
Now lets suppose that an airplane crashed in a nearby woods and your group was asked to rush there to help out. (Allow participants time to do this.) You are told that this wreckage is 40°, 1,000 feet from a given spot. (Explain slowly and carefully the steps to use to find the wreckage.)

Notice several parts of the compass. The direction of travel arrow on the plastic base. This is the arrow that shows which way to walk after the compass is set.

Demonstrate the housing and how it turns. The numbers on the outside of the housing are degrees. Whichever degree number is at the direction of the travel arrow is the degree setting of the compass. Inside of the housing is an arrow shaped needle which swings on a pin. It is magnetic. It always points North, and, therefore, is not the way to go. The direction of travel arrow points the way to go.

Now let's determine which way is 40° -- the way we go. First turn the housing until the figure "40" is at the direction of travel arrow. Now the compass is set, do not turn the compass any more.

Second, hold the compass level, about waist high, with the direction of travel arrow pointing straight ahead of you. Hold the compass with both hands, keeping your elbows tight against both sides. Rotate your body and watch your compass. Keep turning until the red end of the magnetic needle points to the letter N on top of the housing. As you turn make sure to keep the direction of the travel arrow pointed straight ahead of you at all times. When you have turned far enough so that the red end of the needle points to N, you are facing the correct direction to walk.



Give participants several degree readings, until they can quickly and accurately find the direction to travel.

Participants will step off distances. Stepping can be very accurate with a little practice. Usually it is well to learn the feel of a specific length such as 2½ feet, which is the average step for most people, two steps equaling 5 feet. That makes measurement easy because all you have to do is count by fives to determine your distance, (see Addendum -- Measuring Stride) or get a 100 foot long rope. Practice walking along it until you get the feel of a 2½ foot step. Start with your right foot. Each time your left foot hits the ground count by fives. If you reach 100 feet by the time you reach the end of the rope, your step is 2½ feet. If you fell short of the rope, take longer steps. If you passed the rope take smaller steps. Practice several times.

Now let participants combine direction and distance. Give them the following distances and directions:

0° for 50'
90° for 50'
180° for 50'
270° for 50'

(You should be back where you started from. Try other directions and distances.)

Suppose you wanted to find the direction to an object? How could you do it? Face the point toward which you want to take the direction reading. Hold the compass level with direction of travel, arrow pointing straight ahead of you toward the distant point. Turn the compass housing until the red end of the arrow points to N on the housing. Read the number of degrees on the outside rim of the compass housing.

FOLLOW-UP:

1. Participants should now be able to construct a map.
2. Divide participants into groups of three or four, assign each group an area to be mapped.

EXPLANATION: Determining Your Pace

1. Measure off 100' with a measuring tape on some level surface (hallway, driveway, sidewalk, grassy area).

2. Start with left foot and count only right strides (for ease in counting).

3. Walking the way you [illegible] find out how many strides it takes to walk 100'. (Do it three times in order to best judge your stride.)

4. Write down the number of strides you take in 100': ________________. Memorize it because you will be using it for estimating distances in some of your activities.

5. Most people's pace [illegible] between 20 and 26 strides. To find the number of feet for one stride you would divide 100' by your pace, i.e. 100' divided by 22 paces. This gets "sticky" when you start converting [illegible] into inches. The following table can be used in determ[illegible] each child's stride. It is an estimation within 6" of each child's stride.

LENGTH OF EACH STRIDE

If pace for 100' is:	Then each stride is approximately:
20 paces	5'
21 paces	5'
22 paces	4½'
23 paces	4½'
24 paces	4'
25 paces	4'
26 paces	4'

NOTE: For ease of operation [illegible] a 5' stride do pacing for group.

STRIDE CHART FOR CLASS ____________________

STUDENT NAMES	WALKING	RUNNING

LEARNING EXPERIENCE TITLE: *PHYSICAL STRUCTURE OF A STREAM*

AUDIENCE AND/OR GRADE LEVELS: Special Education Teachers/Intermediate
Youngsters with Learning Disabilities
Minor limitations for vision impaired

CURRICULUM DISCIPLINE AREAS: Natural Sciences: Math

CONCEPT: Theme of Learning Experience:
Water currents and their effects.

OBJECTIVES: Participants should be able to:

(1) OBSERVE and distinguish some of the effects of moving water.

(2) Measure the velocity of currents.

(3) Describe several different features of a stream.

(4) Demonstrate the use of senses.

CONCEPTS:

(1) Flowing water is the major cause of erosion.

(2) Currents and velocity shape the physical structure of a stream.

(3) The stream contains various habitats.

MATERIALS:

Stream table
Thermometers
Nets
Trays
pH paper
Pencil, paper
Stop watch
Weighted line marked at one foot intervals
Yardstick
Several small pieces of wood
Tape measure
Collecting container

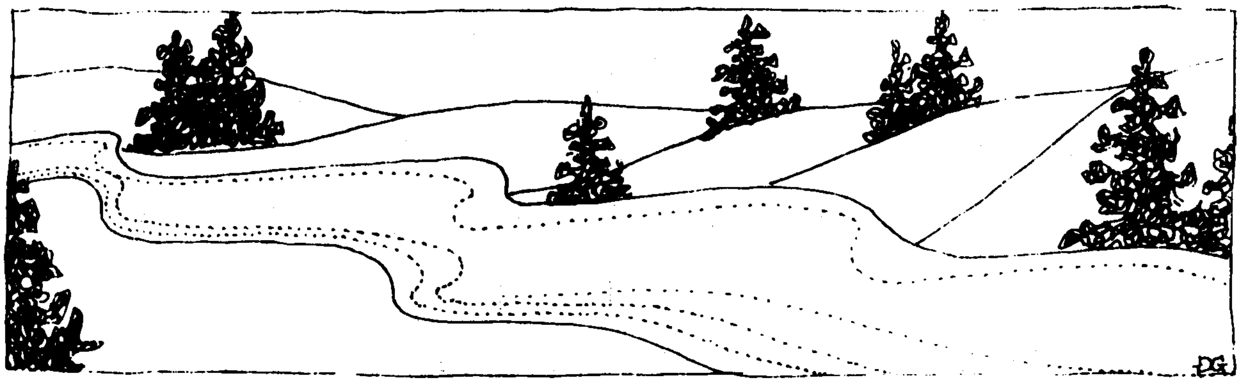
EXPLANATION OF ACTIVITY FOR TEACHER:

Teachers will be able to work in the classroom with a stream table. Also, they will be able to see how a stream is formed and how velocities have an effect on the structure of land. After classroom activity, participants will go out-of-doors and do velocity testing and other related activities.

PROCEDURE:

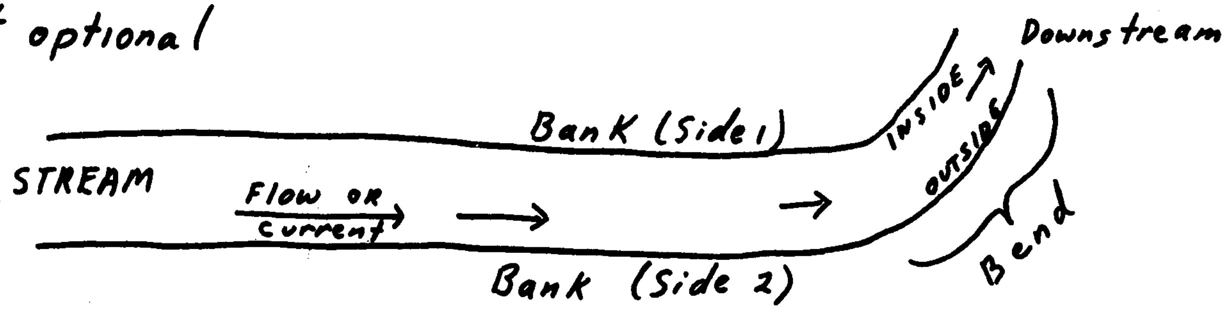
1. Pace or measure a predetermined distance along the stream bank. i.e. 10, 20, or 30 feet.
2. Determine the average depth along that part of the stream by using the weighted line or yardstick (optional).
3. Place the floating object in the centre of the stream a short distance above the starting point. When the object reaches the starting point, measure the time that it takes to travel the predetermined distance. Compute the velocity in the most appropriate terms, feet per second, feet per minute, or miles per hour.
4. Repeat the procedure near the banks.
5. Repeat the procedure at narrow and wide points along the stream and at bends.
6. Repeat the procedure at points with different depths but with similar widths.
7. Record your observations and answer the following questions: (See attached chart.)
    - (a) Is the current faster near the sides or centre of the stream? Why?
    - (b) Is the current faster at narrow or wide parts of the stream? Why?
    - (c) Does the water flow faster on the inside or outside of a bend? Why?
    - (d) Is material deposited on the inside or outside of a bend in the stream? Why?
    - (e) Does depth affect the stream's velocity if its width remains constant? Why? (See procedure #2.)
    - (f) Collect and observe the size of particles (rock, gravel, sand, silt) on the stream bottom and relate them to the velocities recorded. Be sure to label the location of samples.

(g) Have you observed any other factors that affect the current, i.e. border, fallen trees, vegetation. Describe.



Location			*Depth	Velocity	Bottom Material
ite Straight	Width (Approx)	Side #1	▨		
		Center*			
		Side #2	▨		
Wider or Narrower (Cross out one) Than Site #1	Width (Approx)	Side #1	▨		
		Center*			
		Side #2	▨		
Deeper or Shallower (Cross out one) Same Width as site #	Width (Approx)	Side #1	▨		
		Center*			
		Side #2	▨		
Bend		Inside			
		Outside			

* optional



$$\text{Velocity} = \frac{\text{Distance}}{\text{Time}}$$

Example

$\frac{20\text{ ft.}}{10\text{ sec.}} = 2$ f.p.s. × 60 = 120 f.p.m

× 60 = 7,200 f.p.h. ÷ 5,280

= approx. 1.36 m.p.h.

FIELD ACTIVITY:

Look toward the creek from a distance. How can you infer that there is a stream at that location (different vegetation, topography of the land)? Do you think that the stream has always followed the same course as now? What evidence do you see that the stream has changed course (flat deposited land, steep undercut banks)? What evidence is there that the stream is changing its course right now?

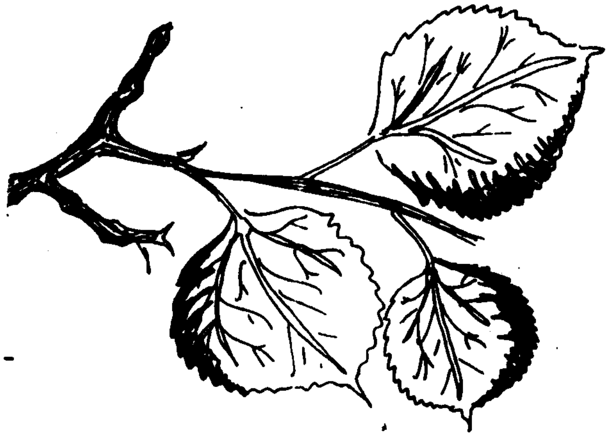
What signs of life do you see along and in the stream?

What things do you see floating on the surface of the stream? What things do you see floating beneath the surface of the stream? Do all floating objects move at the same rate of speed? What things do you see that cause differences in the current?

Try to predict the path the current follows. Go upstream and overturn several rocks to muddy the water. Watch the flow of muddy water. Does the flow of muddy water follow your predicted path? If not, why didn't it follow your predicted path?

Look for places where the current seems to be absent, or to move upstream. (NOTE: These are called eddies.) They are most often found on the downstream side of rocks or other protrusions. Why?

Does the water flow more swiftly near the shore or near midstream? How can you find out? (NOTE: Where the stream makes an S curve, the rate of flow will not be equal on the concave and convex sides. Why?) Where is the water flowing more swiftly? How does the speed correspond to the depths on the curves?



Can you tell the depth of the stream? How? Is the depth of the stream the same at all places? Why not? Where does the water appear to be the deepest? What words describe the appearance of the water where it appears to be the deepest?

Compare the "deep" areas of the stream with the "shallow" areas. List ways they are alike; different.

Is the water always the same depth? What are some things that change the depth of the stream? Find two things in or on the banks of the stream that would indicate the level of the water changes?

How does the water feel? Does it always feel this way? What things would change the feel of the water?

Site Development

PREFACE

There are many reasons why school administrators should be concerned with an outdoor environmental study area on their school site. Within the past few generations, Canadians have changed their way of living from rural to urban life. We are enjoying the highest living standards of any nation. With all this affluence gained within a few decades, we have also managed to change the environment of man. We have polluted almost every major stream; plundered our forests; ruined a million acres of land a year through erosion and poor land development; caused problems with wildlife through the use of insecticides and herbicides; reached a dangerously low level of our fossil fuels and minerals; and have even contaminated the air we breathe.

The human relationship to the environment presents one of this century's greatest changes and one of education's most serious challenges. We need to educate an entire new generation of citizens, planners, developers, engineers, and scientists to understand that mankind is but a part of the environment and what affects the environment will also profoundly affect mankind.

Perhaps just as important is the need for an appreciation for intangibles -- a special feeling for the earth, for beauty and order, and for all things that share this planet with us. The outdoor laboratory provides a place for first-hand experiences -- where children can SEE and HEAR and FEEL the things about them -- where they can develop an ecological awareness, and a feeling of responsible stewardship for the natural environment.

A well-developed school site functioning as an outdoor classroom can be of real value in enriching the curriculum and providing for educational and recreational experiences throughout the child's school years. It is an extension of the indoor classroom. Here a child and his teacher can explore, investigate, gather information, make decisions, and by becoming involved, discover the inter-relationship of man and his environment.

Learning experiences on school sites can be a vital part of a total environmental education program aimed at bringing our youth to a fuller understanding of environmental resource problems and their present and future role in helping to resolve these problems.

SITES FOR CONSERVATION, NATURE, OUTDOOR, AND ENVIRONMENTAL EDUCATION AREAS

Schools in many cases, have a considerable acreage on which good stewardship should be practiced.

Too often, no consideration is given as to how the school site can be used to improve the school curriculum. Many times valuable educational features are destroyed during construction. Trees and brush are bulldozed; aquatic areas are drained or filled; and the site is leveled. This type of development is more costly to create and more expensive to operate. As a result of clearing and leveling practices more air-conditioning is necessary. Lack of trees results in more wind, more heating costs, more seeding, and more mowing of lawns.

How can this waste be avoided? When the land has been acquired a site planning committee should be set up. This planning committee should consist of a key administrator, the architect for the building, a landscape architect, the supervisor of buildings and grounds, a school board member, teachers, students, and natural resource consultants. It would be their job to assist the architect in planning for utilization of the site to maximize educational benefits.

This committee would be responsible for locating and preserving natural features, such as trees, wildflowers, selected open areas, rocks, and wetlands which would enhance the property. Historical features should not be overlooked. The committee should select the outdoor laboratory site. They should evaluate and make recommendations on the school building location. Too often the school building location is chosen purely for aesthetic reasons.

Fence the outdoor laboratory site and let it grow -- nature will develop it. Maintenance people must be informed about the outdoor laboratory boundaries to prevent destroying the area by "neat" mowing.

Plans for new schools should designate habitats to be saved. Existing schools should preserve samples of existing environments and create greater diversity through student projects in conservation.

CHECKLIST OF EDUCATIONAL ENVIRONMENTS DESIRABLE FOR SCHOOL-CONTROLLED PROPERTIES

Dr. John W. Brainerd, professor of biology at Springfield College, Springfield Massachusetts suggests the following types of environments which should be preserved to create opportunites for better conservation and outdoor education.

BARELANDS

Paving as in the parking lot or paved play area. Useful in studies of microclimates and water runoff, correlated with physical sciences and geography.

Planting soil as on eroding bank or field corner where children can perennially experiment with digging, grading, mulching, and stabilizing with plants, then lay it bare again.

BORDERS

Trees and shrubs may be planted as borders around the school property. Not only do they serve as a teaching tool, but they may also act as windbreaks, screens, beautification plantings, and provide food and cover for wildlife.

COURTYARDS

Enclosed and semi-enclosed courtyards can make outstanding outdoor laboratories. Well planned tree, shrub, and grass plantings with a rustic fence, some rocks, and a wetland area can create a learning laboratory.

ELEVATIONS

SLOPES: *Have educational uses related to aesthetics, soil types, microclimates, watershed studies, and distribution of plants and animals. All areas for active play need not be level.*

HILLTOPS: *A properly maintained view from a hill, even a low one, can give students an improved perspective on their environment, whether they are studying astronomy, weather, or patterns of human culture.*

FORBLANDS

Forbs are herbaceous (non-woody) plants other than grasses such as Queen Anne's Lace. There are too many types to try to characterize, but a school should try to include at least a demonstration or natural patches of the following:

> PIONEER ANNUAL HERBS: *Revegetating bare land to be laid bare again at intervals.*
>
> PERRENNIAL HERBS: *Representing later stages of plant succession on bare land. To the layman, these are often "unsightly weed patches", but to the scientist and artist, these are treasure houses.*

GRASSLANDS

LAWNS: *For beauty and soil stabilization. Some should be designated as experimental lawn for the children to study. Many schools have a disproportionately large lawn to the detriment of other possible environments.*

TURF FOR PLAYFIELDS: *With grass species best adapted to heavy wear and tear.*

ROUGH GRASS AREAS: *With perennial species inexpensively manitained by an occasional mowing with sickle bar or scythe, or by grazing.*

ODD AREA AND CORNERS

Often an isolated corner can be planted with a well-planned variety of trees, shrubs, flowering plants, grasses, and legumes. Planting will change useless corners into valuable teaching areas.

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SHRUBLANDS

FOUNDATION PLANTING, CORNER PLANTING, FACING PLANTINGS: Unfortunately, these go in and out of style. They are very useful for educational purposes so should not be entirely omitted, although some compromise with the architect may be necessary.

HEDGES AND SCREEN PLANTINGS: Useful for beauty, life sciences, and as boundaries to delimit areas of different land use. Important as windbreaks and dust filters for control of microclimates. (Don't permit tall shrubbery close to automobile roads where it could hide a scampering child from a driver's view.)

SPECIAL PLANTINGS: Collection of flowering shrubs, small-fruit garden, shrubs used in crafts, wildlife food patch, shrubs for experimental pruning, and a wildlife feeding station. Also suggested is a barbecue area for home economics.

BRUSHLANDS: Much misunderstood by laymen, but needed at schools. Native shrubs may appear above perennial grasses in plant succession or flourish after cutting of trees or sprout after fire.

TREELANDS

SHADE TREES: Either planted or the existing trees. Of obvious use for beauty, nature study, effect on microclimates, yet too often destroyed in site preparation because of economic advantage to the contractor, who may think he is saving money by wholesale bulldozing. Evergreens are favored on the north side of a building and deciduous trees on the south side of a building.

PLANTATIONS: Such as orchards, Christmas trees, trees for posts, lumber and by-products from thinning and pruning; arboretum; experimental forest.

NATIVE WOODS: Samples of various forest types of the region, both managed and preserved as natural areas.

WATER

LAKE, POND, OR PUDDLE: Any body of water is useful for teaching physics, biology, chemistry, social sciences, and the arts. Both natural bodies and artificial impoundments are highly desirable. Especially save natural ponds!

STREAM: Any stream, even temporary rills, are valuable teaching aids. If a playfield must be located where a brook is, don't bury the brook in a culvert but divert it around the field. Keep natural brooks wherever possible -- and pan them for educational gold.

WETLANDS

MARSH: Herbaceous plants such as cattails, grasses, and rushes emerging from water or wet soil. Water has gentle freshwater or saline flow.

SHRUBSWAMP: Low, woody growth in wet soil or water, with some flow of water.

SWAMP: Forested wetland or shallow-water area, with some flow of water.

BOG: Water is stagnant with herbs, shrubs, and/or trees.

All these wetlands have great educational value, especially in the arts and in the sciences.

Developing an outdoor laboratory and program is not easy. Use your imagination. One idea leads to another and a dream becomes a reality.

PROCEDURAL STEPS FOR DEVELOPING AN OUTDOOR LABORATORY

ESTABLISH A SCHOOL SITE OR OUTDOOR LABORATORY COMMITTEE

Select a key administrator or other school personnel to head the project.

Possible committee members:

Landscape architect, land use planners, the supervisor of buildings and grounds, teachers, P.T.A. representative, and other interested members of the community, school board member, students, and a representative of provincial and federal conservation agencies.

COLLECT RESOURCE MATERIALS

Set up a file of information on conservation and school ground planning.

Get information on "existing" projects of a similar nature. Profit by their experience and improve upon it.

MAP AND INVENTORY THE ENTIRE SITE

Plot contours of the land to show slopes and swales.

Record vegetation cover types and their distribution.

Show streams, wet areas, rock outcrops, and other natural features.

Locate teaching stations.

Locate possible vistas to show relationship of outlying terrain features and land uses.

Plan a trail connecting the teaching areas. Urban areas may not have a woodland trail but resources need to be designated and a "trail" planned just as carefully.

Do not overlook nearby areas which might be leased. Many times a low-cost, long-term lease can be obtained, thus economically enlarging the scope of the site. Easements also should be considered.

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REVIEW INVENTORY

Have inventory reviewed by resource individuals and groups -- include conservationists, agency personnel, sportsmen's clubs, women's clubs, garden clubs, P.T.A., and service clubs.

PREPARE A DETAILED LONG-TERM PLAN

The preparation of a step-by-step plan is essential. This plan should include specifications and cost figures.

Organize a trail system by having a main trail with loop trails leading off from it, e.g., geology, forestry, wildlife and/or aquatic loop trails.

PUBLICITY

Publicize the program -- it will help to sell the idea. Resistance to this type of program usually comes from lack of information.

HOW TO USE AN OUTDOOR LABORATORY

Use your outdoor laboratory effectively year round in Grades K-12.

Teacher training programs should be conducted for all teachers as a part of in-service training. Once teachers learn what is available on the site they will use it.

The following is a brief outline of possible uses for different subjects:

MATHEMATICS

Observe designs, shapes, and patterns in nature.

Calculate soil erosion in a gully.

Measure tree diameter, circumference, radius, height, and board feet.

Determine slope of land and differences in elevation.

Plan food costs for the noonday meal.

Use a compass for orienteering.

Construct a trail.

LANGUAGE ARTS

Keep a field notebook and record observations.

Develop a list of vocabulary words and their meaning.

Write poems and stories about the outdoors.

Find information in the library.

Plan the day's schedule.

SOCIAL STUDIES

Develop a conservation project.

Study the past and present economy of the area.

Explore local geography -- hills, valleys, gullies, watersheds, and streams.

Make and read maps.

Study the economics of land use.

Cemetery headstones are a souce of historical information.

Measure minute climate variations in relation to slope, exposure, vegetation cover at various points, recording such factors as precipitation and air humidity, temperatures, evaporation, and wind velocity.

SCIENCE

Study wildlife habits -- homes, tracks, food, adaptations, and shelter.

Explore ecological areas such as woodlands, fields, ponds, streams, and learn the inter-relationships of the plants and animals.

Identify trees and other plants.

Study the weather.

Test the soil for texture, acidity, compactness, water absorption, profile and nutrients.

Examine rocks and minerals for color, composition, hardness, and origin.

Study astronomy.

Make aquatic studies.

ART AND MUSIC

Paint and sketch with natural colors using leaves, flowers, berries, charcoal, or rocks.

Make collages and mosaics from native materials.

Weave with grasses and reeds.

Listen and record sounds of birds, streams, wind, and trees.

Write songs.

Sing songs about the outdoors.

Use a camera.

HEALTH AND PHYSICAL EDUCATION

Plan a well-balanced noonday meal.

Dress properly for the outdoors.

Practice outdoor safety.

Make and play games with native materials.

Do some hiking.

Take a course in hunter safety.

Learn to shoot -- skeet, trap, target, or archery.

Go skiing.

Practice casting.

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INDUSTRIAL ARTS

Design a product utilizing natural resources found on the school site, such as wood, bark, minerals, sand and gravel, and water. Locate resources, decide on management, harvesting, and extraction.

Study, identify, and manage a plantation of trees used by the furniture, lumber, and paper industries.

In a unit on industrial design, design, produce, and install signs and exhibits which will beautify the area and aid in the achievement of the school site's objectives.

Plan, lay out, construct, and set up a manufacturing industry model to show relationships of industry to natural resources and markets.

Prepare and install scale-model exhibits of various mining methods.

Construct shelters, bridges, check dams, tables, fireplaces, birdhouses, and feeders.

Glossary of Terms

GLOSSARY OF TERMS

SPECIAL LEARNING DISABILITIES

AGNOSIA - *The inability to recognize or interpret sensory information even though the sense organ involved is intact.*

APHASIA - *Loss of language. This involves inability to deal with symbols. It can affect ability to interpret or use spoken, read, or written language. When a person is unable to comprehend language that is spoken to him, he is said to have receptive aphasia. When he himself is unable to use language as a medium of expression, he is said to have expressive aphasia.*

APRAXIA - *Apraxia involves inability to evoke language on a voluntary basis. The person physically knows what he wants to say, but is unable to transduce this message into his motor system. This type of apraxia is known as verbal or oral apraxia. Motor apraxia occurs when a person intends to use written language or other means of written or motor expression, but is unable to translate his message into a voluntary motor pattern.*

ARTICULATION - *This term refers to the enunciation of the individual speech sounds of our language.*

ATTENTION SPAN - *This refers to ability to attend to a stimulus. Children with learning disabilities typically have short attention spans, which means that the amount of time they are able to attend to or focus on a specific stimulus is very limited.*

AUDITORY ACUITY - *This refers to the sensation level of hearing. It denotes how well a child is able to hear an auditory stimulus in terms of decibel level.*

AUDITORY DISCRIMINATION - *This refers to the ability of a child to differentiate speech sounds in regard to their pitch and frequency characteristics.*

AUDITORY SEQUENTIAL MEMORY - *This is the ability to produce or retain auditory units (whether digits, letters, or words) in sequence.*

BEHAVIOR MODIFICATION - *This is a current technique of behavior control applied especially to learning situations. The task to be learned is set up in such a way as to generate a correct response and is immediately rewarded. The emphasis is on positive reinforcement of learning.*

CONCEPTUALIZATION - *This is the highest level of learning that man achieves. It assumes that the individual has developed sensation, perception, memory, and symbolization or the use of language. Utilizing these facilities, he goes on to form concepts. Conceptualization includes such processes as categorical reasoning and generalization.*

DIAGNOSTIC TEACHING - *This is the day-by-day teaching or evaluation session in which the teacher or therapist on an informal basis determines through observation and follow-up a child's specific learning strengths and weaknesses. The teacher looks not only at what the child does, but how he does it and why he does it.*

DIRECTIONALITY - *This is the ability to project one's perception of "left" and "right" onto objects or other people within the environment. Directionality also implies that a child can perceive such other directional characteristics as "up", and "down", etc.*

DISTRACTIBILITY - *A child who is distractible pays attention to insignificant stimuli rather than to what is relevant at the time. He may be auditorily distractible, in which case auditory stimuli attracts his attention easily, or he may be overly concerned with visual stimuli. Distractibility is frequently related to deficits in figure-ground perception and also attention span.*

DYSARTHRIA - *Dysarthria is a severe speech impediment in which the defect in articulation is usually caused by central or peripheral nerve damage.*

DYSGRAPHIA - *This is a disorder of written language in which the child is unable to transduce visual to motor patterns. It is also referred to as a specific writing disability.*

DYSLEXIA - *Dyslexia is a specific disorder of reading. Even though the child has a normal IQ, he is unable to learn to read according to his mental and chronological age in spite of emotional, intellectual, and environmental intactness.*

ECHOLALIA - *This is the meaningless repetition of speech sounds and words and is a normal developmental process in a young child's learning of language. It is considered pathological in an older child or adult. Echolalic language or the forced repetition of what has been heard is meaningless speech on the part of the user. It reflects a deficit in receptive understanding of language.*

EEG - *This is the abbreviation for the electroencephalogram. This brain wave test has been used in the past to determine neurological dysfunction. It is helpful in locating sites of seizures and epilepsy in children and adults. However, its value in determining other types of neurological dysfunction is questionable.*

FITZGERALD KEY - *This is a device used in teaching the deaf the structure of our language. It can also be used with language-disordered children who have difficulty with sentence syntax and structure.*

FORMAL DIAGNOSIS - *Formal diagnosis consists of evaluation by a team of professionals who utilize various psychological instruments to determine a child's learning strengths and weaknesses and over-all adjustment.*

HANDEDNESS - *This refers to the child's preferred use of either his left or right hand.*

HYPERACTIVITY - *In simple terms this means that the child is overly active. He seems to be in perpetual motion. It is very difficult for this type of child to settle down to a routine. Children with hyperactive behavior present a problem in the classroom as they are not only distracting to themselves but to other children as well. Parents often consult with their physician about the hyperactivity. In some cases medication is recommended.*

INFORMAL DIAGNOSIS - *This procedure is also considered diagnostic teaching, whereby the teacher, as she works with a child on a day-to-day basis, evaluates his learning process and his specific needs.*

INTELLIGENCE - *Intelligence is a child's native potential for learning. Intelligence is measured by the psychologist through a variety of instruments. It is important to remember that man has two types of intelligence, verbal and nonverbal. For a child with a language disorder, a verbal test of intelligence will give a poor estimate of his overall potential for learning. In this case a nonverbal or performance type of test would be indicated.*

INNER LANGUAGE - *This is the ability of a child to use the symbols in his environment, either those he hears or sees, to structure his own world. It is difficult to evaluate the inner language of a child or the language he uses for thinking. However, it can be observed, if one watches the child's play to see if it is integrated, or observes how he interacts with his environment.*

INVERSION - *This term is used to describe reading errors in which the directionality of letters is confused. In this instance letters are confused in regard to the directional positions of "up" and "down". The child may read (u) for (n) or (T) for (ℓ) or (w) for (m).*

KINESTHESIS - *This is the perception or feeling of movement.*

LANGUAGE - *Language is the utilization of symbols for the purpose of communication. Language is of three types: spoken, read, or written.*

LANGUAGE EXPERIENCE APPRAOCH - *This is an approach to reading in which the material to be read is directly related to the language experiences of the child. For example, it may be a story or sentence that he has dictated. The class might also take a field trip and come back and discuss and write down what they saw.*

LATERALITY - *Laterality refers to a person's differentiation of the two sides of his body.*

LINGUISTICS - *Linguistics is a scientific and systematic study of the components of our speech and language system.*

MODALITY - *Modality refers to one of the sensory processes through which learning occurs, either vision, audition, kinesthesis, or taction.*

MORPHOLOGY - Morphology is commonly referred to as grammar. It deals with the smallest lexical units of our language (morphemes), which are words, roots, affixes, or inflectional endings.

MULTISENSORY - This term is used to describe learning experiences in which several sensory modalities are used to reinforce one another.

NEUROLOGICAL - This term refers to the central nervous system, which includes the cerebral cortex and the underlying brain structures.

NEUROLOGICAL DYSFUNCTION - This term indicates that something is not "working right" in the brain, consequently causing a disturbance in the learning process.

OVERLEARN - To "overlearn" something is to learn it so well that one's responses become "automatic". For example, we overlearn to drive a car, play the piano, type, etc. Many of the associations in reading are also overlearned and allow us to read easily and "automatically". Consequently, we can concentrate on the content of what we are reading rather than on the decoding process itself.

OVERLOADING - Overloading in learning occurs when the brain is required to make more discriminations or associations at any one time than it is capable of doing. A child with neurological impairment generally has lower tolerance limits for the processing of information. Thus, we must be very careful not to overload him.

PERCEPTION - This is the level of learning experience that requires a child to interpret the sensory information he receives.

PERSEVERATION - This is the inability of a person to restructure his thinking quickly. The child with perseveration persists with a response that is no longer appropriate. Perseveration may occur in the verbal or language area, which is called verbal perseveration. It may also occur as a motor function.

PSYCHOLOGICAL EVALUATION - This includes diagnostic instruments that measure a child's native intelligence for learning, perceptual tests, and apperception tests of emotional maturity.

REAUDITORIZATION - This refers to the ability of the person to recall the auditory image of a sound or a word.

REVERSAL - This term is used to describe reading errors in which the directionality of the word letter is perceived in "reversed" order. The child is said to "see" letters or words "backwards". (p) is read for (q), or (b) is read for (d), (Was) is read for (saw), and so forth.

REVISUALIZATION - This refers to a person's ability to recall the visual image of a letter, word, or picture.

SENSATION - This is the lowest level of learning experience and refers to the activation of sensory-neural structures.

SEQUENT

SOCIAL

SPATIAL

SPECIAL

SPEECH

SYMBOLI

SYNTAX -

TEMPORAL

SEQUENTIALIZATION - This is the ability to order and structure events in a predesignated sequence.

SOCIAL PERCEPTON - This involves the recognition and perception of social interrelationships and structures.

SPATIAL ORIENTATION - This involves a child's or person's ability to locate himself in a space world. It deals with such correlates as left, right, in, on, under, on top, etc.

SPECIAL LEARNING DISABILITIES - This term refers to a disorder in the process of speech, language, reading, writing, or arithmetic. A child with a specific learning disability is assumed to have normal over-all learning potential. However, he displays a deficit in one or more of the areas listed above.

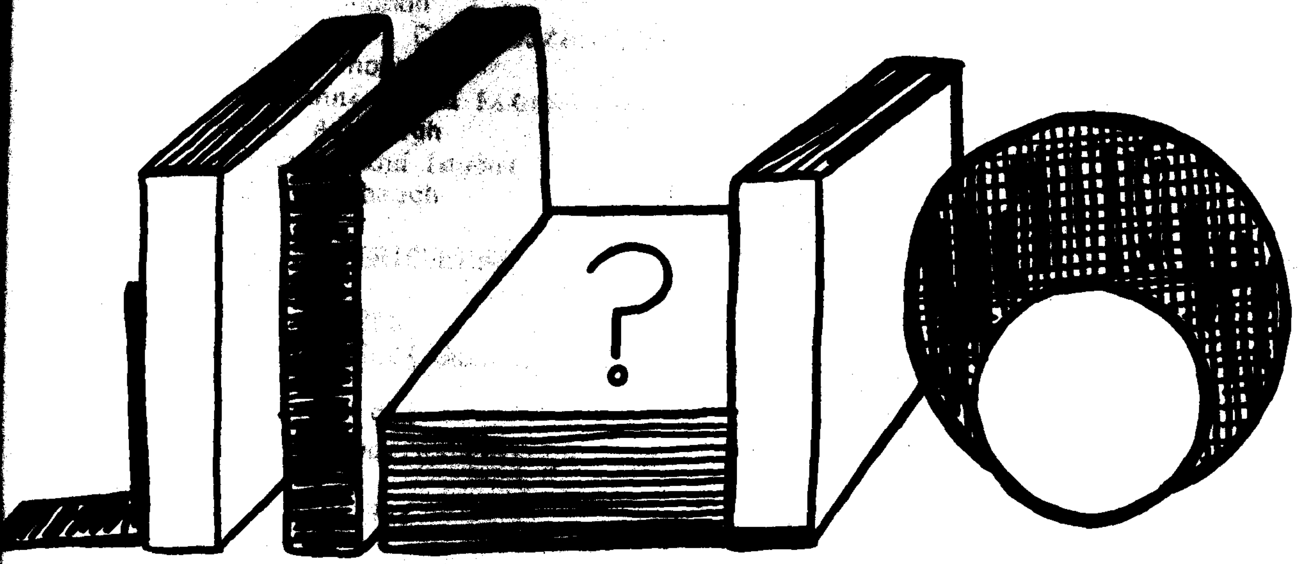
SPEECH - Speech is the articulation of the sounds of our language for the purpose of communication.

SYMBOLIZATION - This is the utilization of symbols by which various units of experience are represented by predesignated signs or symbols (words).

SYNTAX - Syntax refers to the arrangement and relationship of components within a grammatical structure, such as the sentence.

TEMPORAL RELATIONSHIPS - These are basically relationships dealing with time. For example, they involve such concepts as before and after. The passage of time needs to be perceived in order for a child to understand the calendar with its terminology of yesterday, today, and tomorrow. Since temporal relationships are frequently difficult for the SLD child to grasp, they should be explained in as visual, graphic terms as possible.

References



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Information Services Branch
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5
Environmental Fact Sheets for Teachers

THE CONSERVATIONIST
New York State Conservation Department
Room 339
State Office Campus
Albany, N.Y. 12226
A Conservation Education Area to Enrich Your School
by Joseph J. Shomon and Robert F. Holmes
How to Lay Out a Nature Trail
by LeRoy G. Irving

NATIONAL AUDUBON SOCIETY
1130 Fifth Avenue
New York, N.Y. 10028
A Nature Centre for Your Community
by Jospeh J. Shomon
Manual of Outdoor Conservation Education
by Joseph J. Shomon
Steps in Planning and Establishing a Nature Centre
by Byron L. Ashbaugh
Trail Planning and Layout
by Byron L. Ashbaugh

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Washington, D.C. 20250
Developing The Self-Guiding Trails in The National Forests

M.P. 968 1964
Teaching Conservation Through Outdoor Education Areas

P.A. 837 1968

THE MICHIGAN DEPARTMENT OF EDUCATION
Lansing, Michigan 48902
The Community School Site -- A Laboratory for Learning
NDEA Title III Bulletin 314

THE PENNSYLVANIA DEPARTMENT OF EDUCATION
Harrisburg, Pennsylvania 17126
School Site Development For Conservation and Outdoor Education
by Eleanor H. Bennett

NATURE STUDY WINTER 1966-67
The Explorable Instant or When to Open the Classroom Door
by Phyllis S. Busch

AMERICAN NATURE STUDY SOCIETY
Springfield College, Springfield, Mass. 01109
Natural Areas as School Conservation Education Aids
by John W. Brainerd, Professor of Biology

THE AMERICAN BIOLOGY TEACHER
NOVEMBER, 1967
Natural Environment Awareness
Part 1: Using Urban Resources
by Kingsley L. Greene

GRADE TEACHER OCTOBER, 1965
The Natural Interest in Natural Resources
by George L. Fersh

SCHOOL BOARD JOURNAL APRIL, 1964
The Need for Large School Sites
by Richard W. DeRemer and B. G. Lauda

THE RESOURCES AGENCY
Sacremento, California 95814
Outdoor Education on Your School Grounds May, 1968
by Norman F. Marsh

PROJECT SPRUCE, OPERATED THROUGH TITLE III ESEA
Box 96A Pine Plains, N.Y. 12567
Seven Steps for Developing an Outdoor School Area for Teaching Science-Conservation
by Phyllis S. Busch

Film

INTERNATIONAL FILM BUREAU, INC.
332 S. Michigan Avenue, Chicago, Illinois 60604
An Approach to School Site Development
Produced by William B. Stapp, Ph.D. and Spenser Havlick, M.N., Department of Conservation, School of Natural Resources of the University of Michigan
Available for loan, U.S. Forest Service,
6816 Market Street, Upper Darby, Pennsylvania 19082

SOURCES OF MATERIALS

Ministry of the Environment
Information Services Branch
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5
Pamphlets, posters, fact sheets,
audio-visual presentations

Federation of Ontario Naturalists
1262 Don Mills Road
Don Mills, Ontario
M3B 2W8

Ontario Association for
Children with Learning Disabilities
Suite 322, 88 Eglinton Avenue East
Toronto, Ontario
M4P 1B8
Pamphlets, publications, films

Ontario Teachers' Federation
1260 Bay Street
Toronto, Ontario
M5R 2B4

Owl Magazine
The Young Naturalist Foundation
59 Front Street East
Toronto, Ontario
M5E 1B3

Moyer Vico Corp.
25 Milvan Drive
Weston, Ontario
M9L 1Z1

American Diabetes Assn.
18 E. 48th Street
New York, N.Y. 10017
A.D.A. forecast, bimonthly magazine
reprints, pamphlets

American Foundation for the Blind
15 West 16th Street
New York, N.Y. 10011
Pamphlets, books, periodicals, films

American Heart Association
Inquiries Section
44 East 23rd Street
New York, N.Y. 10010
Films, slide films, pamphlets,
posters, exhibits

American Medical Association
Bureau of Health Education
535 N. Dearborn Street
Chicago, Ill. 60610
Films, pamphlets, posters, exhibits,
radio transcriptions, television
scripts, packets, lists, and the
magazine: Today's Health

American Occupational Therapy Assn.
251 Park Avenue, South
New York, N.Y. 10010
Pamphlets, posters, radio scripts,
slide films, exhibits, lists, movies,
T.V. spots, technical reprints, manuals
of professional interest

American Physical Therapy Assn.
1740 Broadway
New York, N.Y. 10019
Pamphlets, posters, radio and TV
scripts, slide films, exhibits,
catalogues, movies, magazine articles -
monthly journal

Arthritis Foundation
1212 Avenue of the Americas
New York, N.Y. 10036
Pamphlets, posters, radio scripts,
transcriptions, film

Association for the Aid of Crippled
Children
Division of Publications and Public
Education
345 E. 46th Street
New York, N.Y.
Pamphlets, reprints, exhibits, lists,
movies, books

Nature Canada Bookshop
75 Albert Street
Ottawa, Canada
K1P 6G1

Alexander Graham Bell Association
for the Deaf
1537 35th Street, N.W.
Washington, D.C. 20007
Pamphlets, lists, movies --
for deaf and hard of hearing

The Association for Children with
Learning Disabilities
61 Lincoln Street
East Orange, New Jersey

Better Vision Institute, Inc.
230 Park Avenue
New York, N.Y. 10017
Pamphlets, slide sound films,
movies

Center for Mass Communication
Columbia University Press
440 W. 110th Street
New York, N.Y.
Films, pamphlets, posters, radio
scripts, transcriptions, records,
comic books

Child Study Association of
America, Inc.
9 E. 89th Street
New York, N.Y. 10028
Pamphlets, publication and book
lists, leaflet on organizing a
parent education program

The Council for Exceptional Children
Suite 900
Jefferson Plaza
1411 Jefferson Davis Highway
Arlington, Virginia 22202

Convention of American Instructors
of the Deaf
5034 Wisconsin Ave., N.W.
Washington, D.C. 20016

Encyclopedia Britannica Films, Inc.
Public Relations
1150 Wilmette Avenue
Wilmette, Illinois
Slide films, cartoons, movies

Equitable Life Assurance Society of
the United States
Bureau of Public Health
1285 Avenue of the Americas
New York, N.Y. 10036
Booklets, posters, related materials

Information Service Division
Department of National Health and
Welfare
Ottawa, Ontario
Dominion of Canada
Pamphlets, films

John Hancock Mutual Life Insurance Co.
Health Education Service
200 Berkeley Street
Boston, Mass.
Pamphlets, lists

Metropolitan Life Insurance Co.
Health and Welfare Division
1 Madison Avenue
New York, N.Y. 10010
Pamphlets, exhibits, films, film
strips, catalogs

Muscular Dystrophy Associations of
America, Inc.
Public Information Department
1790 Broadway
New York, N.Y. 10019
Pamphlets, reprints, films, radio
scripts, exhibits, TV clips

National Association for Mental Health,
Inc.
10 Columbus Circle
New York, N.Y. 10019

National Easter Seal Society for
Crippled Children and Adults
2023 W. Ogden Avenue
Chicago, Illinois 60612
Pamphlets, radio scripts, Crippled
Child Magazine, bulletin, books,
news releases, film and transcription
libraries

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National
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Pamphlet
TV spot
manuals,

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New York
Newslett
tion mat

National Association for Retarded Children
420 Lexington Avenue
New York, N.Y. 10017
Pamphlets, periodicals, audio-visual materials, films, film strips, records, tape recordings

National Assn. of Hearing & Speech Agencies
919 - 18th Street N.W.
Washington, D.C. 20006
Pamphlets, posters, reprints of articles from Hearing News

National Epilepsy League
130 N. Wells Street
Chicago, Ill.
Quarterly newspaper: Horizon, pamphlets

National Foundation - March of Dimes
800 Second Avenue
New York, N.Y. 10017
Pamphlets, booklets, films, film strips, exhibits, bibliographies

National Health Council, Inc.
1740 Broadway
New York, N.Y. 10019
Pamphlets, reprints, leaflets, list of publications, health career materials

National Hemophelia Foundation
Metropolitan Chapter
175 Fifth Avenue
New York, N.Y. 10010
Pamphlets

National Multiple Sclerosis Society
257 Park Ave., South
New York, N.Y. 10010
Pamphlets, radio scripts, radio and TV spot announcements, medical manuals, fact sheets

National Public Federations Council of Health and Welfare Services, Inc.
419 Park Avenue South
New York, N.Y. 10010
Newsletter, Library of Health Education materials

National Society for the Prevention of Blindness, Inc.
79 Madison Avenue
New York, N.Y. 10016
Films, pamphlets, posters, exhibits, radio scripts, catalogs, vision testing charts

Public Affairs Pamphlets
381 Park Avenue South
New York, N.Y. 10016
Popularly written pamphlets on a variety of subjects in health and social welfare field

United Cerebral Palsy Association of New York State, Inc.
220 W. 42nd Street
New York, N.Y. 10036
Pamphlets, posters, films, radio transcriptions, etc.

United States Department of Health, Education and Welfare
Washington, D.C. 20202

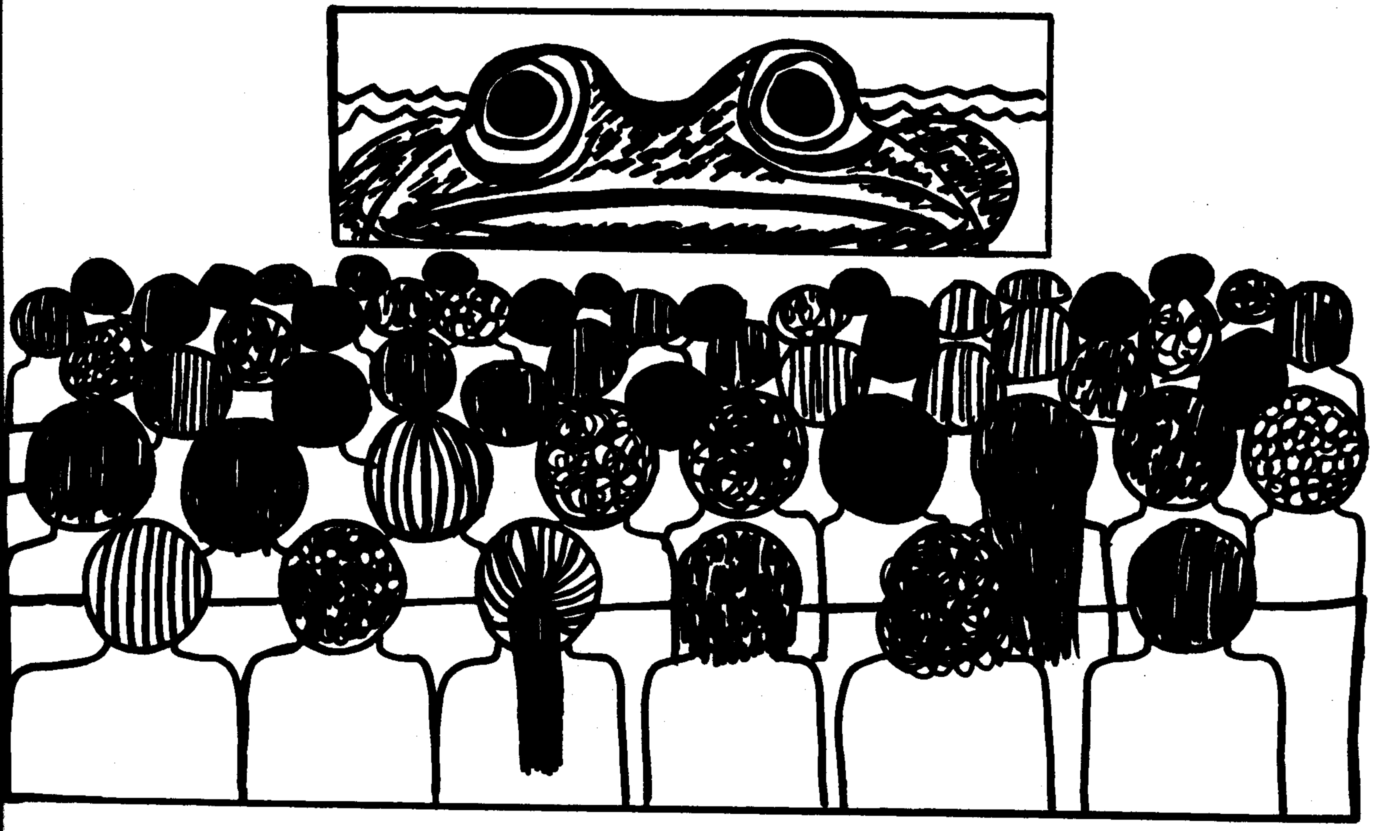
1. The Children's Bureau
   Pamphlets, catalogs, lists
2. The Office of Education
   Pamphlets, catalogs, lists
3. The Office of Vocational Rehab.
   Pamphlets, radio scripts, exhibits, lists, films
4. The United States Public Health Services
   Leaflets and pamphlets

New Jersey Association for Children with Learning Disabilities
61 Lincoln Street
East Orange, N.J.

New Jersey Association for Retarded Children, Inc.
97 Bayard Street
New Brunswick, N.J. 08901

Easter Seal Society for Crippled Children and Adults of N.J.
799 Main Street
Hackensack, N.J.

Films



FILMS

ALONE IN THE MIDST OF THE LAND

This is a film within a film. It uses a science fiction approach. A man of the future returns to the Academy of Sciences to see a movie of the earth as it was in 1970. The internal movie is a chronicle of the destruction and murder of the earth as we know it. The statistics that the film cites would easily overwhelm an audience were their impact not mitigated by the film-within-a-film technique. Presented as it is, the film is frightening, perhaps, but also apt to provoke thought and action. 27 minutes.

BOOMSVILLE

This brilliant animated overview of the growth of cities shows what man has done to his environment. Without a single work of narration, it recreates step-by-step how man took a virgin land and made of it a frantic, congested boomsville. The growth of cities, the advent of a pleasure-loving society -- these are some of the themes sketched with clarity and wit. 11 minutes. Available from the National Film Board.

The following films may be borrowed from Modern Talking Picture Services, 1943 Leslie Street, Don Mills, Ontario. 1-416-444-7347.

ENVIRONMENT ONTARIO

This film provides a look at the pollution problems in this Province, some of the solutions, and the role of the Ministry of the Environment and its staff in managing the environment in Ontario. This is recommended as a 'first choice' for those interested in an overview of the environmental problems in the Province. 23 minutes, color

WOMEN IN THE ENVIRONMENT

To commemorate International Women's Year, the Ministry of the Environment embarked upon a project to serve as a tribute to the many women employed in the environmental field...a film. The result is more than a catalog of jobs. It is a film containing a mass of important, up-to-date, environmental information. The film should be of particular value to biology and geography teachers of senior secondary school students as well as to guidance counsellors. 26 minutes.

THE INVISIBLE RIVER

Produced by the Ministry of the Environment for a general audience, this film holds special appeal for young people. The construction of a water supply system to carry water from the Great Lakes to an inland community is compared to building a children's sand castle on a beach. 19 minutes, color